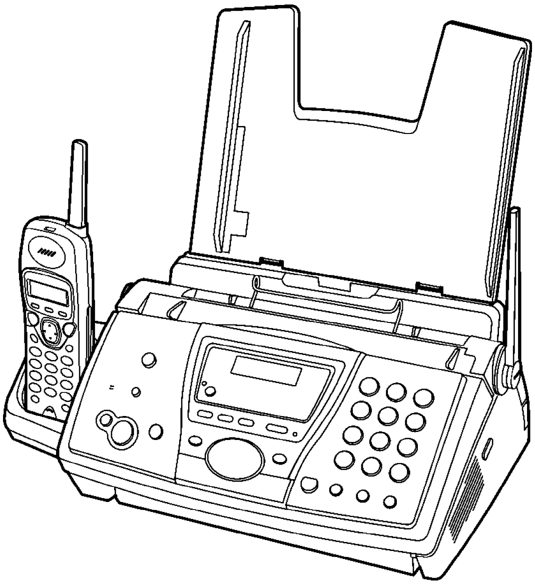
ORDER NO. KMF0308684C1
F7

2.4GHz Digital Cordless and Answering System and Fax

KX-FPG376 / KX-FPG377

(for U.S.A.)



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Panasonic

When you note the serial number,write down all 11 digits. The serial number may be found on the bottom of the unit.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product the printed circuit boards will be marked PbF.
Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.

When this mark does appear please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

1. INTRODUCTION

1.1. ABOUT LEAD FREE SOLDER (PbF: Pb free)

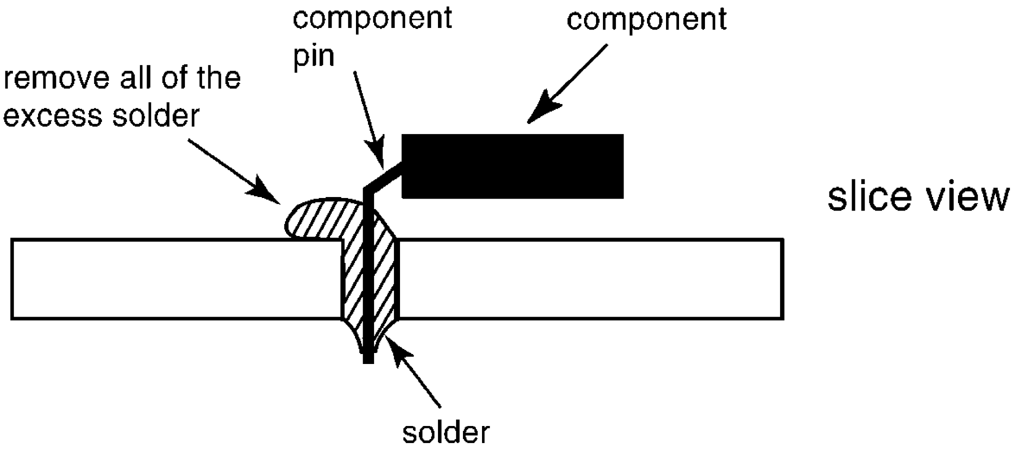
Note:
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.
We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin (Sn), Silver, (Ag), and Copper, (Cu).
This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

Caution

- **PbF solder has a melting point that is 50° ~ 70° F, (30° ~ 40°C) higher than Pb solder. Please use a soldering iron with**

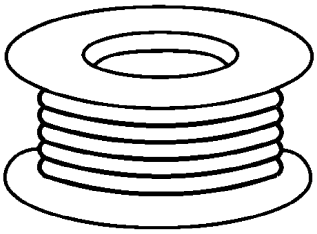
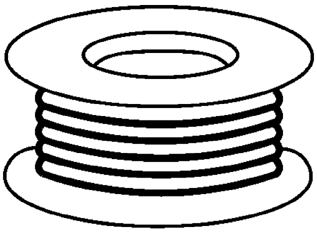
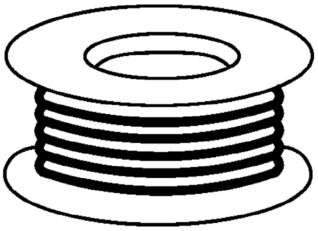
temperature control and adjust it to 700° ± 20° F, (370° ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.

- **PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F, (600°C).**
- **If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.**
- **When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See figure, below).**



1.1.1. Suggested PbF Solder

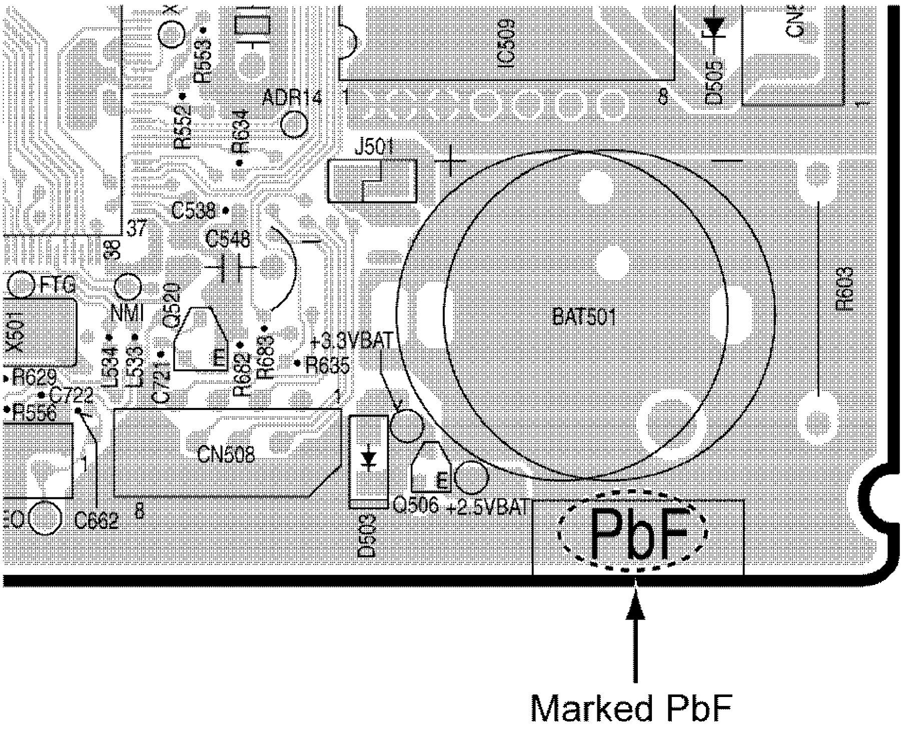
There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper,
(Sn+Ag+Cu), you can also use Tin and Copper, (Sn+Cu), or Tin, Zinc, and Bismuth, (Sn+Zn+Bi). Please check the manufacturer's specific instructions for the melting points of their products and any precautions for using their product with other materials.
The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.

0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

1.1.2. How to Recognize that Pb Free Solder is Used

P.C.Boards marked as "PbF" use Pb Free solder. (See the figure below.)
Pb Free is not used the Power Supply Board of this unit.

(Example : Digital Board)


R553
R552
R634
ADR14
IC509
D505
CN
J501
C538
C548
37
38
FTG
NMI
Q520
X501
L534
L533
C721
E
R682
R683
+3.3VBAT
R635
BAT501
R603
R629
C722
R556
CN508
C662
8
1
D503
Q506
+2.5VBAT
PbF
Marked PbF

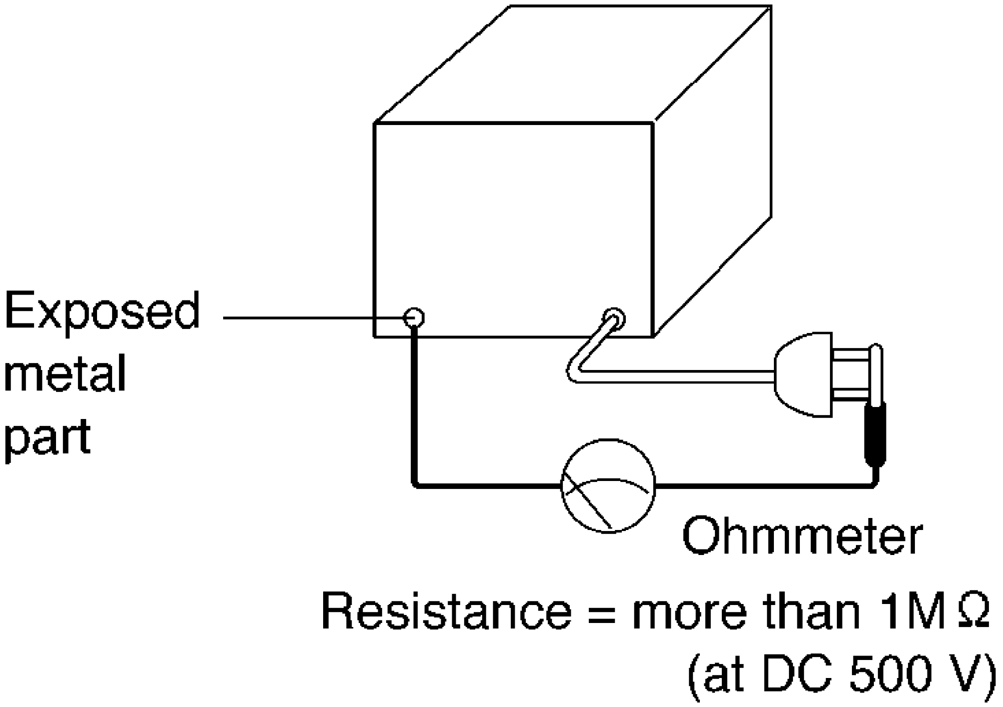
Note:
The "PbF" marked may be found on different areas of the same P.C.Board, depending on manufacture date.

1.2. SAFETY PRECAUTIONS

1. Before servicing, unplug the AC power cord to prevent an electric shock.
2. When replacing parts, use only the manufacturer's recommended components.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

1.3. INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part (screw heads, control shafts, bottom frame, etc.).
   Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard.



1.4. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When repairing, the following precautions will help prevent recurring malfunctions.

1. **Cover the plastic part's boxes with aluminum foil.**
2. **Ground the soldering irons.**
3. **Use a conductive mat on the worktable.**
4. **Do not touch the IC or LSI pins with bare fingers.**

1.5. BATTERY CAUTION

CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to following caution :
Disposal of lithium batteries should be performed by permitted, professional disposal firms knowledgeable in state government federal and local hazardous materials and hazardous waste transportation and disposal requirements.
A battery continues to have no transportation limitations as long as it is separated to prevent short circuits and packed in strong packaging.

Commercial firms that dispose of any quantity of lithium cells should have a mechanism in place to account for their ultimate disposition. This is a good practice for all types of commercial or industrial waste.

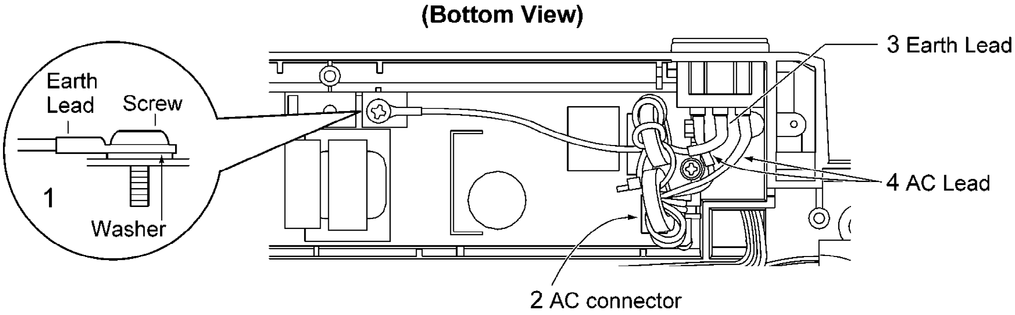
Recommend Type Number:

CR2032 (BAT501) Manufactured by MATSUSHITA/SONY/HITACHI/ TOSHIBA

1.6. AC CAUTION

For safety, before closing the lower cabinet, please make sure of the following precautions.

1. **The earth lead is fixed with the screw.**
2. **The AC connector is connected properly.**
3. **Wrap the earth lead around the core 3 times.**
4. **Wrap the AC lead around the core 2 times.**

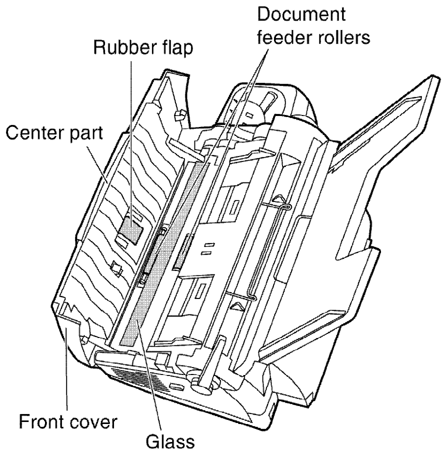


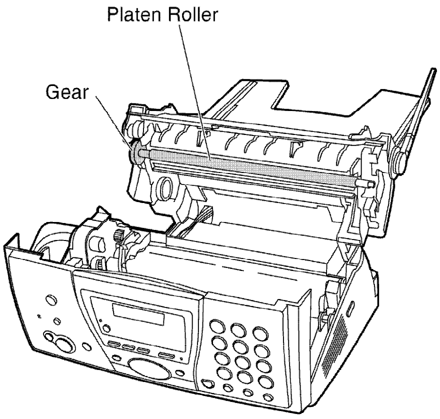
1.7. PERSONAL SAFETY PRECAUTIONS

1.7.1. Moving Sections of the Unit

Be careful not to let your hair, clothes, fingers, accessories, etc., become caught in any moving sections of the unit.

The moving sections of the unit are the rollers and a gear. There is a separation roller and a document feed roller which are rotated by the document feed motor. A gear rotates the two rollers. Be careful not to touch them with your hands, especially when the unit is operating.



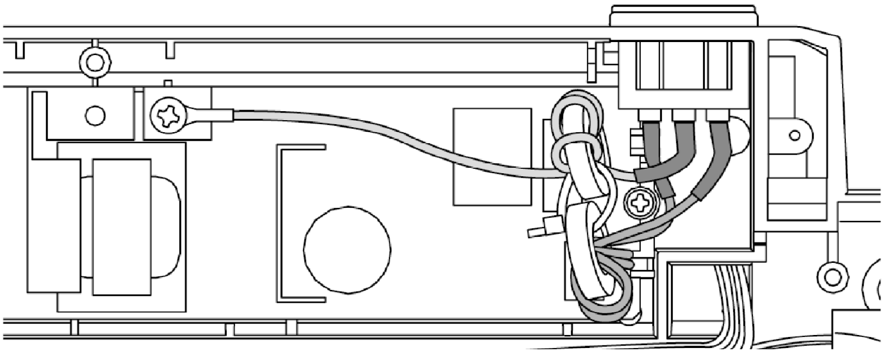


1.7.2. Live Electrical Sections

All the electrical sections of the unit supplied with AC power by the AC power cord are live. Never disassemble the unit for service with the AC power supply plugged in.

CAUTION:

AC voltage is supplied to the primary side of the power supply unit. Therefore, always unplug the AC power cord before disassembling for service.

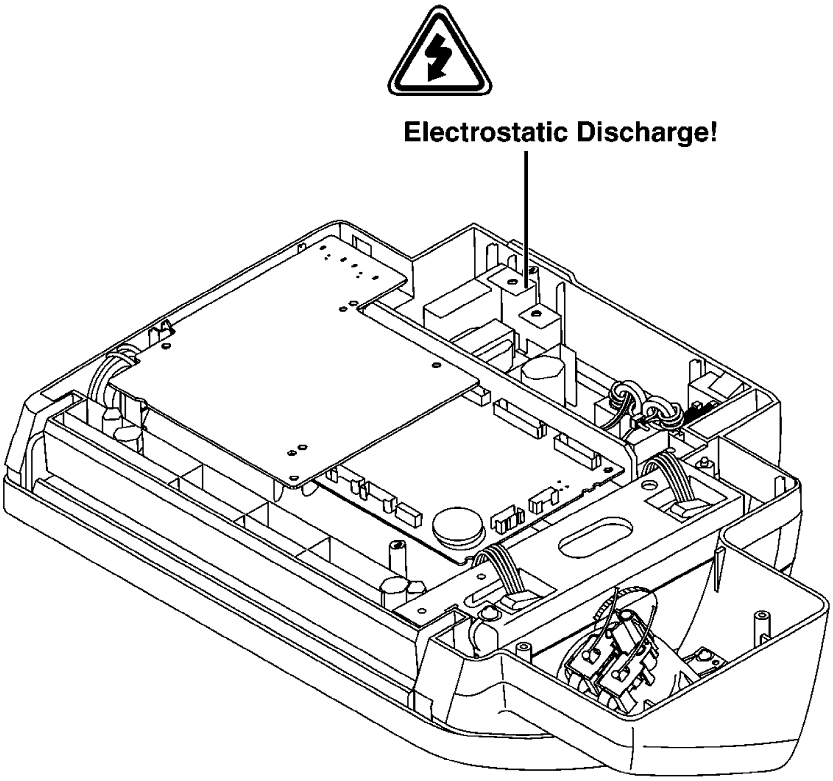


(Bottom View)

1.8. SERVICE PRECAUTIONS

1.8.1. Precautions to Prevent Damage from Static Electricity

Electrical charges accumulate on a person. For instance, clothes rubbing together can damage electric elements or change their electrical characteristics. In order to prevent static electricity, touch a metallic part that is grounded to release the static electricity. Never touch the electrical sections such as the power supply unit, etc.



2. FEATURES AND SPECIFICATIONS

2.1. FEATURES

General

- Help function

  Display:

- SEND GUIDE
- BASIC SETTINGS
- FEATURE LIST
- TAM OPERATION
- FAX SND/RCV
- COPIER
- Q and A
- ERRORS
- REPORTS
- CALLER ID
- LCD (Liquid Crystal Display) readout

Plain Paper Facsimile Machine

- 9 second transmission speed *
- Letter / Legal / A4, G3 compatible

- **Automatic document feeder (up to 10 sheets)**
- **Quick scan**
- **Resolution: Standard, Fine/Photo (64 level), Super fine**
- **Broadcast with Navigator**
- **30-sheet recording paper capacity (20 lb.)**
- **Automatic fax/phone switching**
- **Distinctive ring detection ****

*** The 9 second speed is based upon the ITU-T No. 1 Test Chart on the condition that memory transmission is performed.**
**** Subscription to distinctive ring services is required.**

Large Memory... Performed by DRAM
Approx. 28 pages of memory reception
Approx. 25 pages of memory transmission

Integrated Telephone System

- **On-hook dialing**
- **Digital duplex speakerphone**
- **Voice muting**
- **Redialing function**
- **Both the handset and base unit up to 50-Station telephone directory in total.**
- **Caller ID compatible**
  Feature requires a subscription to caller identification services offered by certain local telephone companies for a tee. You and your caller(s) must be in areas that provide caller identification services, and compatible equipment must be used by both telephone companies. Feature not available when the unit is connected to a PBX system.
- **Caller IQ feature**

Enhanced Copier Function

- **Multi-copy function (up to 30 copies)**
- **Enlargement and reduction**
- **Collate**
- **64-Level halftone**

Digital Answering System

- Voice Time / Day Stamp
- 18-Minutes recording time
- Voice paper call

2.4 GHz Cordless

- Fax activation from handset
- 11 day battery life

2.2. OPTIONAL ACCESSORIES

Model No.	Description	Specifications
KX-FA92	Replacement Film*1	2 rolls-216 mm × 35 m (8 1/2”×114’) (Each roll will print about 113 letter sized pages)
P-P511	Battery	------------------------
KX-TCA60, KX-TCA86, KX-TCA88, KX-TCA91, KX-TCA92, KX-TCA98	Headset	Allows hands-free telephone conversations.

*1 To ensure the unit operates properly, we recommend the use of a Panasonic replacement film.

2.3. SPECIFICATIONS

Any details given in these instructions are subject to change without notice.

2.3.1. Base Unit

Applicable Lines:

Public Switched Telephone Network

Document Size:

Max. 216 mm (8 1/2") in width, Max. 600 mm (23 5/8") in length

Effective Scanning Width:

208 mm (8 3/16")

Recording Paper Size:

Letter: 216×279 mm (8 1/2"×11")
Legal: 216×356 mm (8 1/2"×14")
A4: 210×297 mm (8 1/4"×11 11/16")

Effective Printing Width:

Letter/Legal: 208 mm (8 3/16")
A4: 202 mm (7 15/16")

Recording Paper Weight:

60 g//m^2 to 90 g/m^2 (16 lb. to 24 lb.)

Transmission Time*1:

Approx. 9 s/page (Original mode)*2

Scanning Density:

Horizontal: 8 pels/mm (203 pels/inch)
Vertical:
3.85 lines/mm (98 lines/inch)—in standard resolution,
7.7 lines/mm (196 lines/inch)—in fine/photo resolution,
15.4 lines/mm (392 lines/inch)—in super fine resolution

Halftone Level:

64-level

Scanner Type:

Contact Image Sensor

Printer Type:

Thermal Transfer on Plain Paper

Data Compression System:

Modified Huffman (MH), Modified READ (MR)

Modem Speed:

14,400 / 12,000 / 9,600 / 7,200 / 4,800 / 2,400 bps; Automatic Fallback

Operating Environment:

5—35°C (41—95°F), 20—80 % RH (Relative Humidity)

Dimensions:

Approx. height 128 mm × width 389 mm × depth 242 mm (5 1/32"×15 5/16"×9 17/32")

Mass (Weight):

Approx. 3.1 kg (6.8 lb.)

Power Consumption:

Standby: Approx. 7.5 W
Transmission: Approx. 12 W

Reception: Approx. 50 W (When receiving a 20% black document)
Copy: Approx. 50 W (When copying a 20% black document)
Maximum: Approx. 135 W (When copying a 100% black document)

Power Supply:

120 V AC, 60 Hz

Fax Memory Capacity*3:

Approx. 25 pages of memory transmission
Approx. 28 pages of memory reception

Voice Memory Capacity*4:

Approx. 18 minutes

*1 Transmission speed varies depending on page content, resolution, telephone line conditions, and the other party’s machine.

*2 Transmission speed is based upon the ITU-T No. 1 Test Chart and original mode. (Refer to ITU-T No.1 Test Chart ().) If the capabilities of the other party’s machine are inferior to your unit, the transmission speed may be lower.

*3 Based on the ITU-T No. 1 Test Chart in standard resolution.

*4 Including greeting messages. Total recording time may be reduced by the calling party´s background noise.

2.3.2. Handset

Operating Environment:

5°C—40°C (41°F—104°F), 20%—80% RH (Relative Humidity)

Frequency:

2.402 MHz—2. 480 MHz

Dimensions:

Approx. height 246 mm × width 54 mm × depth 42 mm (9 11/16”×2 1/8” × 1 21/32”)

Mass (Weight):

Approx. 228 g (0.5 lb.)

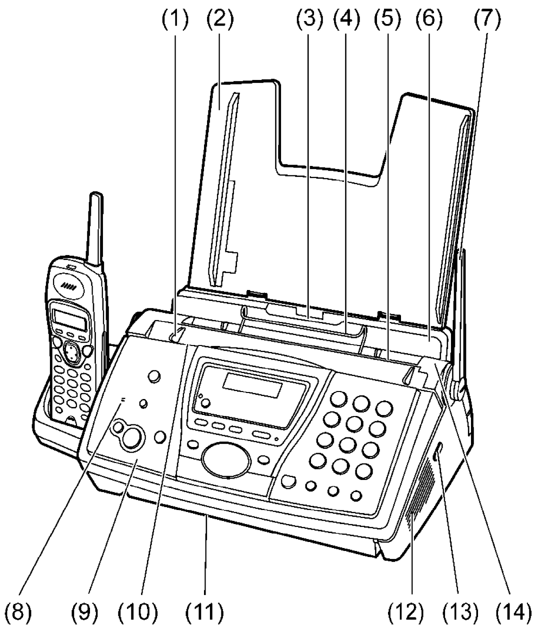
Power Supply:

Ni-Cd battery (3.6 V, 850 mAh)

3. LOCATION

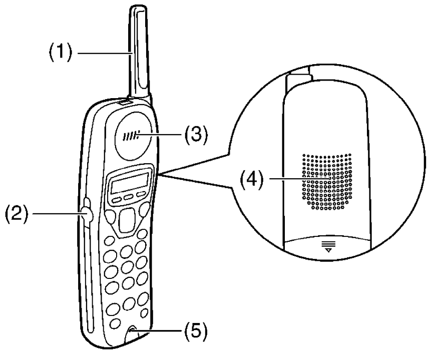
3.1. OVERVIEW

3.1.1. Base Unit



(1) Document guides
(2) Paper tray
(3) Recording paper entrance
(4) Metal Recording paper guide
(5) Recording paper exit
(6) Tension plate
(7) Antenna
(8) Microphone
(9) Front cover
(10) Document entrance
(11) Document exit
(12) Speaker
(13) Green button (Back cover release button)
(14) Back cover

3.1.2. Handset

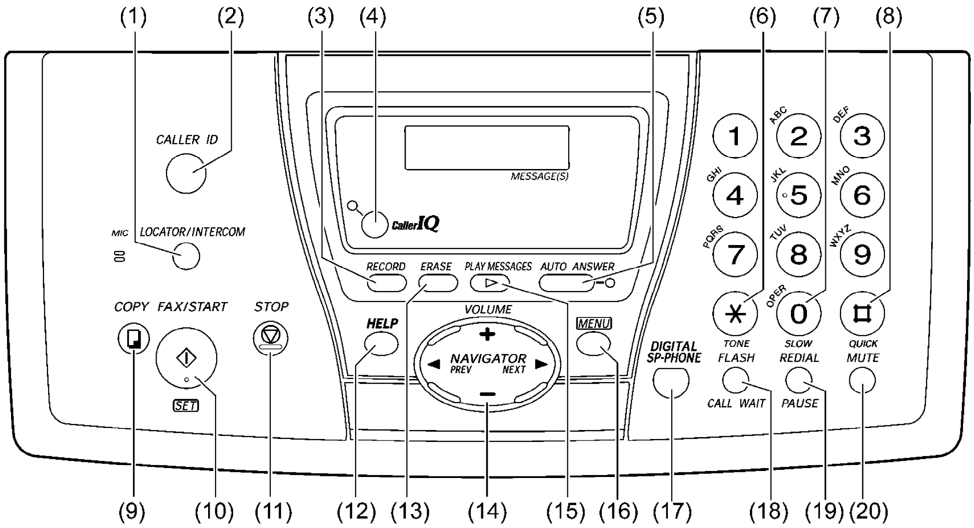


(1) Antenna
(2) Headset jack

(3) Receiver
(4) Speaker
(5) Microphone

3.2. CONTROL PANEL

3.2.1. Base Unit


(1)
(2)
(3)
(4)
(5)
(6)
(7)
(8)
CALLER ID
MESSAGE(S)
CallerIQ
MIC
LOCATOR/INTERCOM
RECORD
ERASE
PLAY MESSAGES
AUTO ANSWER
1
ABC 2
DEF 3
GHI 4
JKL 5
MNO 6
PQRS 7
TUV 8
WXYZ 9
OPER 0
COPY
FAX/START
STOP
SET
HELP
VOLUME
NAVIGATOR
PREV
NEXT
MENU
DIGITAL SP-PHONE
TONE
FLASH
CALL WAIT
SLOW
REDIAL
PAUSE
QUICK
MUTE
(9)
(10)
(11)
(12)
(13)
(14)
(15)
(16)
(17)
(18)
(19)
(20)

(1) [LOCATOR/INTERCOM]

- To locate or page the handset.

(2) [CALLER ID]

- To use Caller ID features.

(3) [RECORD]

- To record a greeting message.
- To record a memo message.

(4) [CALLER IQ]

- To use the Caller IQ feature.

(5) [AUTO ANSWER]

- To turn ON/OFF the AUTO ANSWER setting.

(6) [TONE]

- To change from pulse to tone temporarily during dialing when your line has rotary pulse services.

(7) [SLOW]

- For slow playback.

(8) [QUICK]

- For quick playback.

(9) [COPY]

- To initiate copying.

(10) [FAX/START] [SET]

- To initiate fax transmission or reception.
- To store a setting during programming.

(11) [STOP]

- To stop an operation or programming.
- To clear a character/number.

(12) [HELP]

- To print a quick reference.

(13) [ERASE]

- To erase recorded messages.
- To erase a recorded greeting messages.

(14) [NAVIGATOR] [VOLUME]

- To navigate to the next operation.
- To search for a stored item.
- To select features or feature settings during programming.

- To adjust volume.

(15) [PLAY MESSAGES]

- To play recorded messages.

(16) [MENU]

- To initiate or exit programming.

(17) [DIGITAL SP-PHONE]

- For speakerphone operation.

(18) [FLASH] [CALL WAIT]

- To access special telephone services such as call waiting or for transferring extension calls.

(19) [REDIAL] [PAUSE]

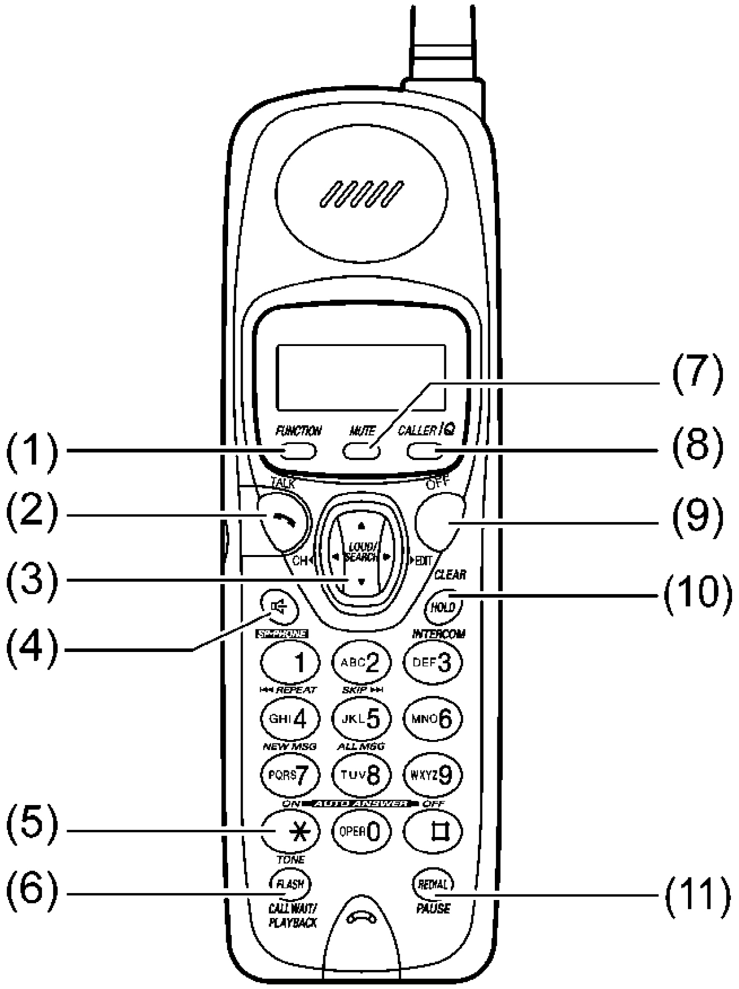
- To redial the last number dialed from the base unit.

- To insert a pause during dialing or after pressing [FLASH].

(20) [MUTE]

- To mute your voice to the other party during a conversation. To release the mute, press this button again.

3.2.2. Handset


(1)
(2)
(3)
(4)
(5)
(6)
(7)
(8)
(9)
(10)
(11)
FUNCTION
MUTE
CALLER IQ
TALK
OFF
CH
LOUD/SEARCH
EDIT
CLEAR
HOLD
SP-PHONE
INTERCOM
1
ABC 2
DEF 3
REPEAT
SKIP
GHI 4
JKL 5
MNO 6
NEW MSG
ALL MSG
PQRS 7
TUV 8
WXYZ 9
ON
AUTO ANSWER
OFF
OPER 0
TONE
FLASH
CALL WAIT/
PLAYBACK
REDIAL
PAUSE

(1) [FUNCTION]

- To initiate programming.

(2) [TALK]

- To make/answer calls.

(3) Navigator, [LOUD/SEARCH] [CH] [EDIT]

- To navigate to the next operation.

- To adjust volume.

- To search for a stored item.

- To select features or feature settings during programming.

- To select a clear channel.

- To edit the caller’s phone number.

(4) [SP-PHONE]

- For speakerphone operation.

(5) [TONE]

- To change from pulse to tone temporarily during dialing when your line has rotary pulse services.

(6) [FLASH] [CALL WAIT/PLAYBACK]

- To access special telephone services such as call waiting or for transferring extension calls.
- To listen to recorded message.

(7) [MUTE]

- To mute your voice to the other party during a conversation. To release the mute, press [MUTE], [TALK] or [SP-PHONE].

(8) [CALLER IQ]

- To use the Caller IQ feature.

(9) [OFF]

- To hang up.
- To stop an operation or programming.

(10) [CLEAR] [HOLD] [INTERCOM]

- To clear a character.
- To erase an item.
- To put a call on hold.
- To page the base unit.

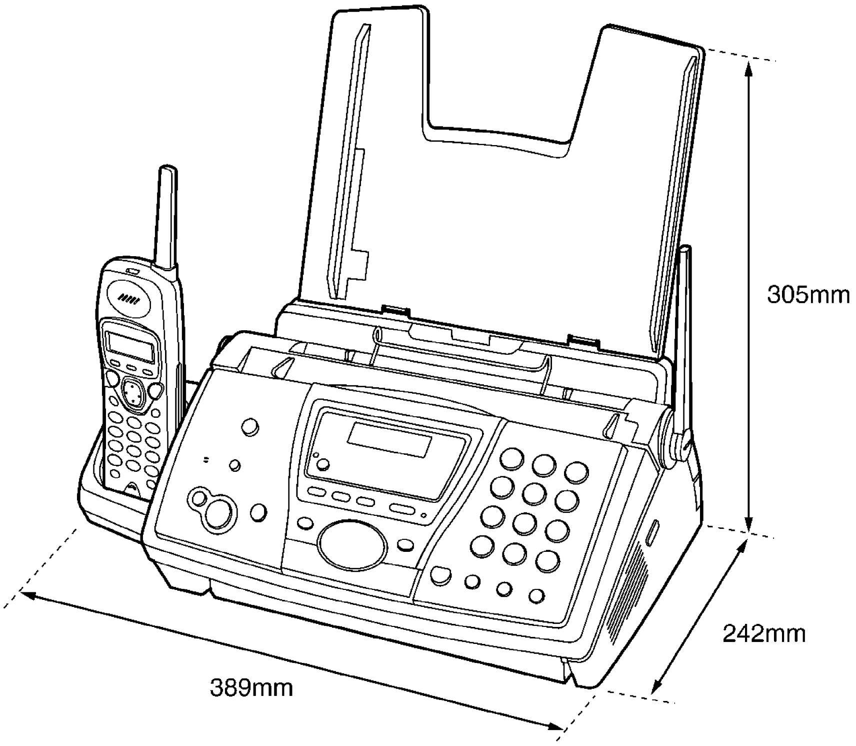
(11) [REDIAL] [PAUSE]

- To redial the last number dialed from the handset.
- To insert a pause during dialing.

4. INSTALLATION

4.1. INSTALLATION SPACE

The space required to install the unit is shown below.
The dimensions given are necessary for the unit to operate efficiently.



Note:

- **Avoid excessive heat or humidity.**
- **Use the unit within the following ranges of temperature and humidity.**
- **Ambient temperature: 5°C to 35°C**
- **Relative humidity: 20% to 80% (without condensation)**
- **Power cord length should be less than 5 meters (16.4 feet). Using a longer cord may reduce the voltage or cause malfunctions.**
- **Avoid direct sunlight.**
- **Do not install near devices which contain magnets or generate magnetic fields.**
- **Do not subject the unit to strong physical shock or vibration.**

- **Keep the unit clean. Dust accumulation can prevent the unit from functioning properly.**
- **To protect the unit from damage, hold both sides when you move it.**

4.2. CONNECTIONS

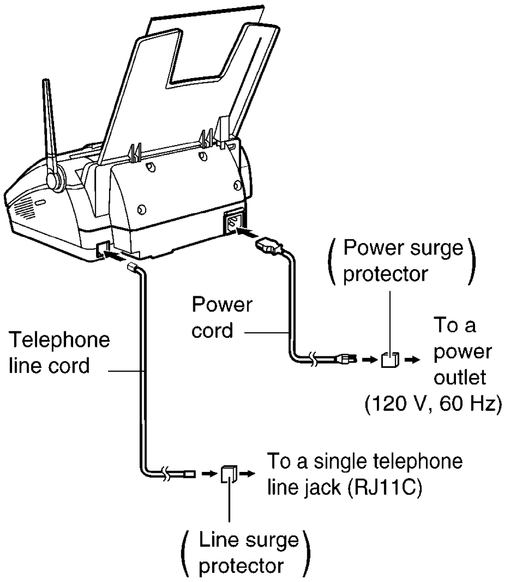
Caution:

- **When you operate this product, the power outlet should be near the product and easily accessible.**

4.2.1. Base Unit

(1) Connect the telephone line cord.

(2) Connect the power cord.


Power surge protector
Power cord
To a power outlet (120 V, 60 Hz)
Telephone line cord
To a single telephone line jack (RJ11C)
Line surge protector

Note:

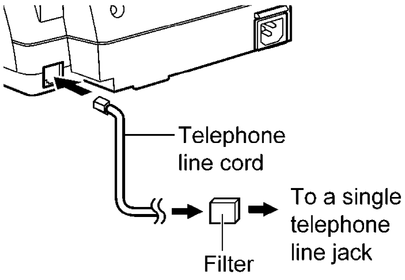
- **To avoid malfunction, do not position the fax machine near appliances such as TVs or speakers which generate an intense magnetic field.**
- **This unit may disturb the performance of other devices connected to the same telephone line.**

Using surge protectors:

- **The warranty does not cover damage due to power line surges or lightning. For additional protection, we recommend the use of a surge protector.**

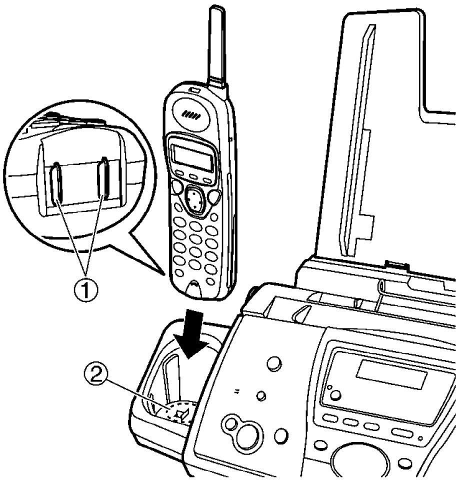
If you use this unit with a computer or subscribe to an xDSL service:

- Fax transmission/reception may be disturbed, or you may hear interference noise during telephone conversation. A filter to prevent this is provided from your service company. Please attach the filter to the telephone line cord of the fax machine.



4.3. BATTERY CHARGE

Place the handset on the cradle of the base unit for about 9 hours before initial use.



- A beep will sound and the base unit display will show "CHARGING" for an instant, then the date and time will be displayed.

Note:

- To ensure the battery charges properly, clean the handset charge contacts (①) and the charger charge contacts (②) with a soft, dry cloth once a month. Clean more often if the unit is subject to

grease, dust or high humidity.
- The battery cannot be overcharged.

Battery strength
You can verify the battery strength on the handset display.

Handset Display	**Battery strength**
[▮▮▮]	Fully charged
[▮▮]	Medium
[▮]	Low
[▮] (flashing)	Needs to be recharged.

Battery life

- **Battery life is dependent on use and conditions, but in general if your Panasonic battery is fully charged:**
  —it should last up to 5 hours while in use (in conversation).
  —it should last up to about 11 days while not in use (off the base unit).

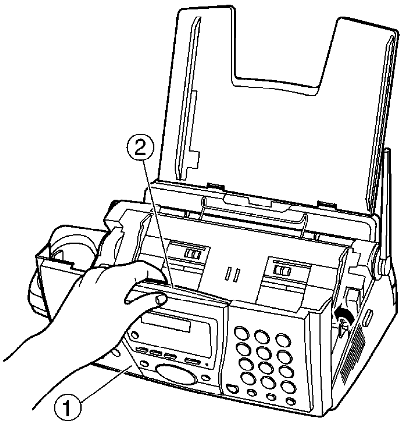
Recharge
Recharge the battery when:
—the handset beeps intermittently while it is in use.
—"Recharge" is shown and [▮] flashes on the handset display.

- **Recharge the handset battery for more than 15 minutes, or the display will continue showing the indication.**

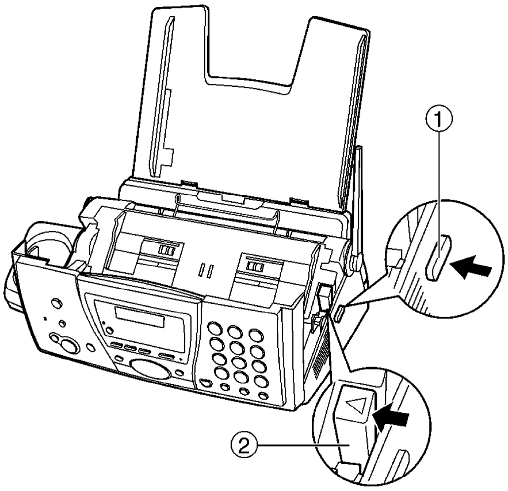
Automatic security code setting
The security code helps to avoid unauthorized use of your telephone line by another cordless telephone. Whenever you place the handset on the base unit, the unit will automatically select one of more than a million stitchery codes.

4.4. INSTALLING THE INK FILM

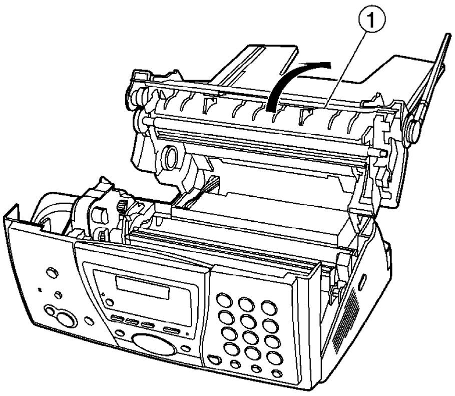
1. Open the front cover (①) by pulling up the center part (②).



2. **Release the back cover by pushing the green button (①) on the right side of the unit.**
   OR
   Release the back cover by pushing in the green lever (②) in the unit.

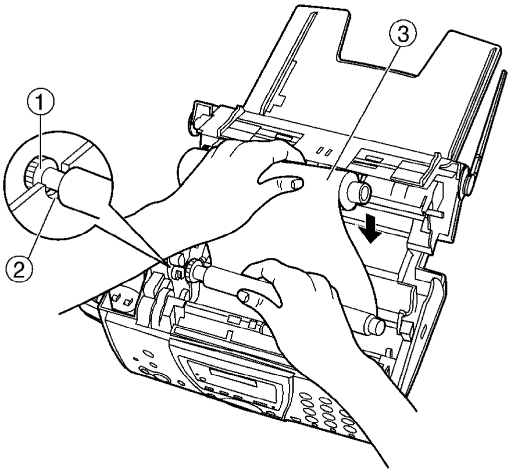


3. **Open the back cover (①).**

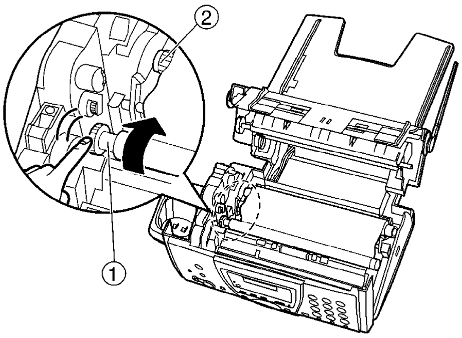


4. **Insert the gear of the blue core (①) into the left slot of the unit (②). Insert the rear ink film roll (③).**

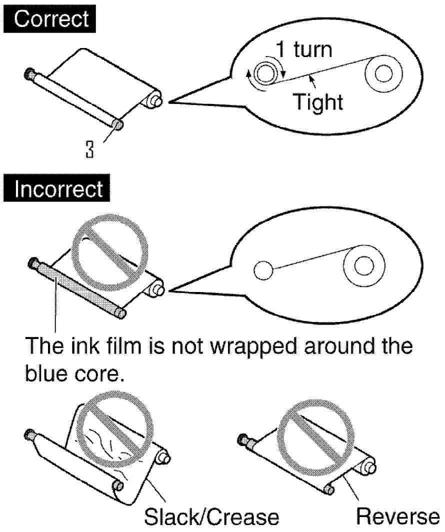
   - The ink film is safe to touch, and will not rub off on your hands like carbon paper.



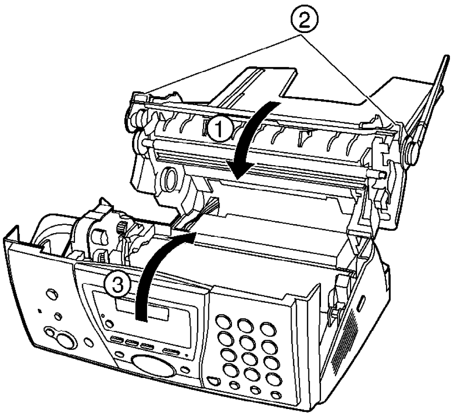
5. **Turn the gear of the blue core (①) in the direction of the arrow until the white core (②) begins to turn.**



- **Make sure that the ink film is wrapped around the blue core (③) at least once.**


Correct
1 turn
Tight
3
Incorrect
The ink film is not wrapped around the blue core.
Slack/Crease
Reverse

6. First close the back cover securely (①) by pushing down on the dotted area on both sides (②). Then close the front cover securely (③).



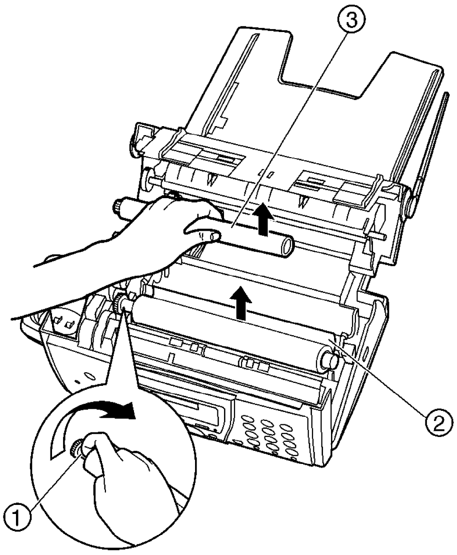
4.5. REPLACING THE INK FILM

The included film roll is a starter ink film. To ensure that the unit operates properly, we recommend the use of Panasonic replacement film. (Refer to OPTIONAL ACCESSORIES ().)

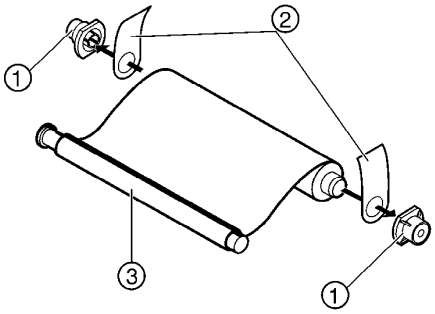
- **We cannot be responsible for any damage to the unit or degradation of print quality which may occur from the use of non-Panasonic replacement film.**

1. Open the covers. (See steps 1 to 3 on INSTALLING THE INK FILM ().)

2. Pull out the blue gear (①) and remove the used ink film (②).
Remove the used core (③).



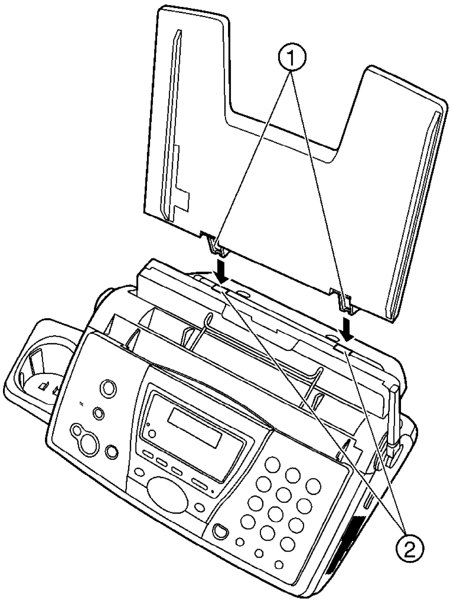
3. Remove the stoppers (①) and tags (②) from the new ink film (③).



4. Insert the ink film and close the covers. (See steps 4 to 6 on
INSTALLING THE INK FILM ().)

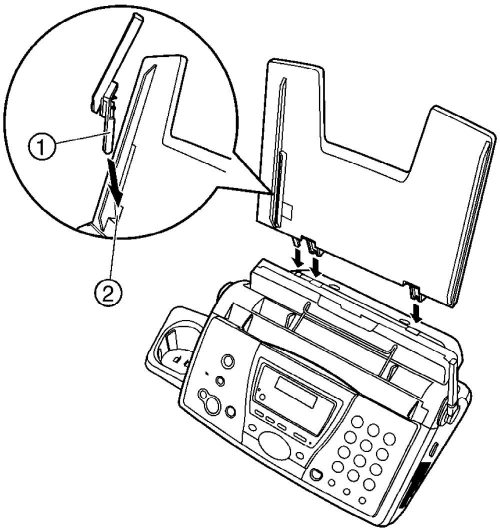
4.6. INSTALLING THE PAPER TRAY

Insert the tabs on the paper tray (①) into the slots on the back of the unit (②).



To use A4 size paper

Insert the tab on the A4 paper guide (①) into the slot on the paper tray (②) and push the guide until it clicks into place. Attach the paper tray to the back of the unit.



Note:

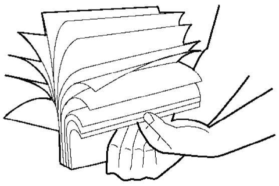
- **Change the recording paper size to “A4” (feature #16 on Program Mode Table ().)**

4.7. INSTALLING THE RECORDING PAPER

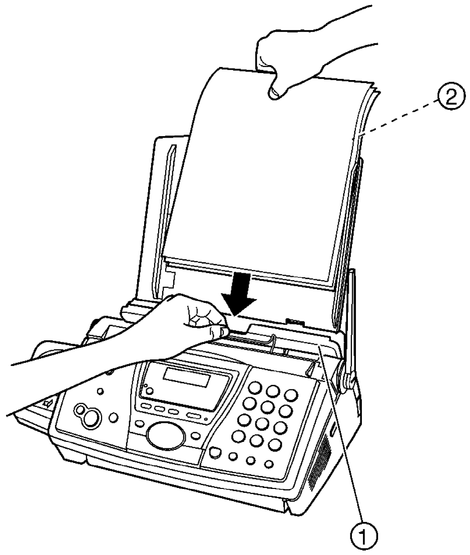
The unit can hold:
—Up to 30 sheets of 60 g/m^2 to 80 g/m^2 (16 lb. to 21 lb.) paper.
—Up to 20 sheets of 90 g/m^2 (24 lb.) paper.
—No more than 20 sheets of legal paper.
For superior results, we recommend Hammermill ® Jet Print paper.

Trademarks:
Hammermill is registered trademark of INTERNATIONAL PAPER in the United/States and/or other countries.

1. **Before insert a stack of paper, fan the paper to prevent paper jams.**

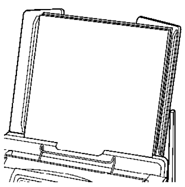


2. **Pull the tension plate forward (①) and insert the paper, print-side down (②), then push the tension plate back.**

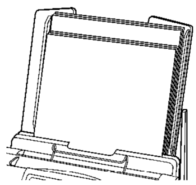


- If the paper is not inserted correctly, readjust the paper, or the paper may jam.

Correct

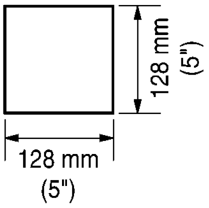


Incorrect

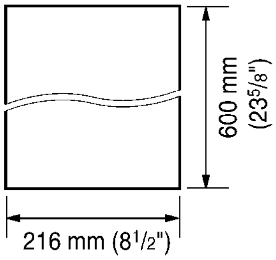


Documents you can send

Minimum size

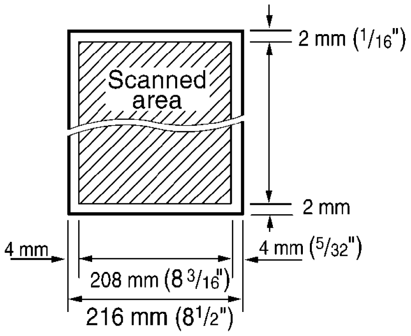

128 mm
(5")
128 mm
(5")

Maximum document size


600 mm
(23 5/8")
216 mm (8 1/2")

Effective scanning area

- Shaded are (①) will be scanned.


Scanned
area
2 mm (1/16")
2 mm
4 mm
4 mm (5/32")
208 mm (8 3/16")
216 mm (8 1/2")

Document weight

- Single sheet:

45 g/m^2 to 90 g/m^2 (12 lb. to 24 lb.)

- Multiple sheets:

60 g/m^2 to 80 g/m^2 (16 lb. to 21 lb.)

Note:

- Remove chips, staples or other similar fasteners.
- Do not send the following types of documents. (Use copies for fax transmission.)
  — Chemically treated paper such as carbon or carbonless duplicating paper
  — Electrostatically charged paper
  — Badly curled, creased or torn paper
  — Paper with a coated surface
  — Paper with a faint image
  — Paper with printing on the opposite side that can be seen through the other side, such as newsprint
- Check that ink, paste or correction fluid has dried completely.
- To transmit a document with a width of less than 210 mm (8 $^{1}/_{4}$”), we recommend using a copy machine to copy the original document onto A4 or letter-sized paper, than transmitting the copied document.

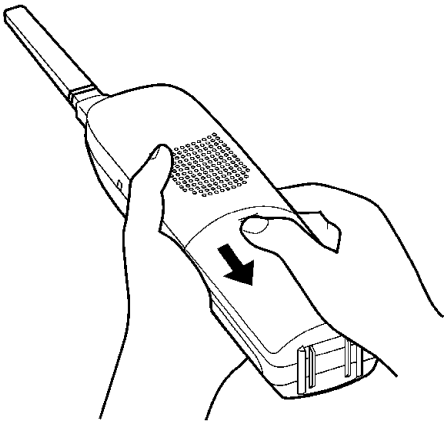
4.8. BATTERY REPLACEMENT

If battery performance diminishes, make sure you have cleaned the charge contacts and fully charged he battery. After recharging, if “Recharge” is displayed and [▮] continues to flash, the battery needs to be replaced.

Please use only Panasonic batteries. See page OPTIONAL ACCESSORIES ().

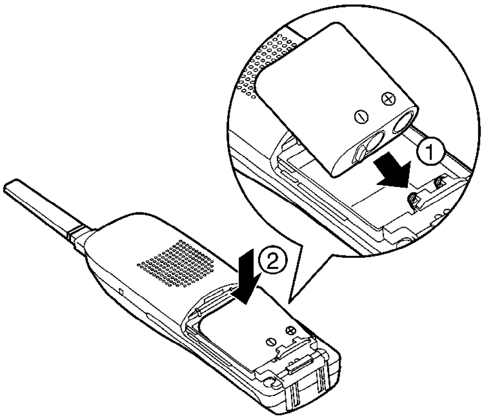
- Only use rechargeable batteries. If you install non-rechargeable batteries and start charging them, the batteries may leak electrolyte.

1. Press the arrow on the battery cover firml and slide the cover.

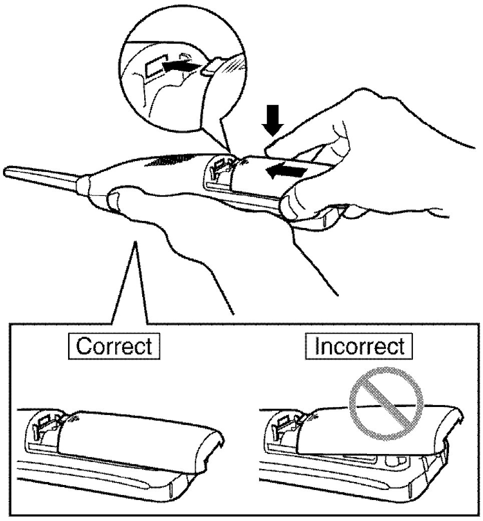


2. Remove the old battery.

3. Insert the new battery, matching the correct polarity (①), then push the battery down into the compartment (②).



4. To close, reset the battery cover flat against the handset and slide the battery cover while pressing it down, as indicated by the arrow.



Attention:

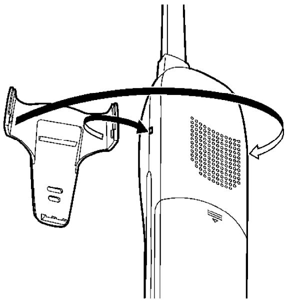
RECYCLE
RBRC
Ni-Cd
1.800.822.8837

A nickel cadmium battery that is recyclable, powers the product you have purchased. At the end of its useful life, under various state and local laws, it is illegal to dispose of this battery into your municipal waste stream.

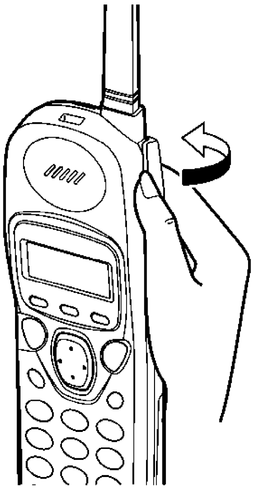
4.9. INSTALLING THE BELT CLIP

You can hang the handset on your belt or pocket using the belt clip.

To attach the belt clip.



To remove the belt clip.

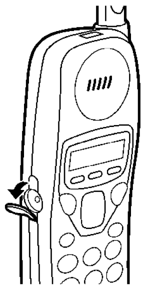


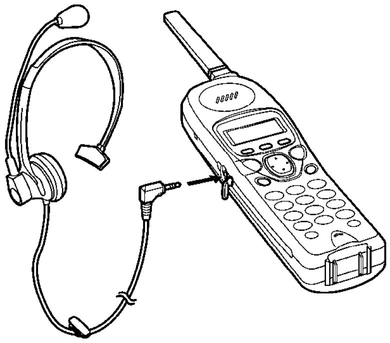
4.10. INSTALLING THE HEADSET (optional)

Plugging an optional headset into the handset allows to have hands-free telephone conversations. Please use only a Panasonic headset. See OPTIONAL ACCESSORIES ().

To connect an optional headset to the handset

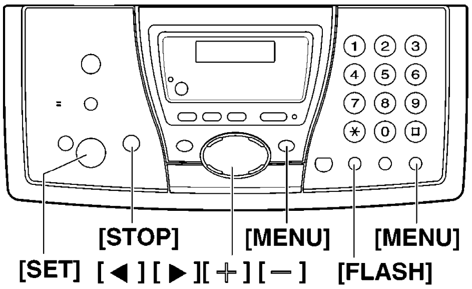
(Model shown is KX-TCA88)





4.11. SETTING YOUR LOGO

The logo can be your company, division or name.


[STOP]
[MENU]
[MENU]
[SET]
[◀][▶][+][−]
[FLASH]

1. Press [MENU].

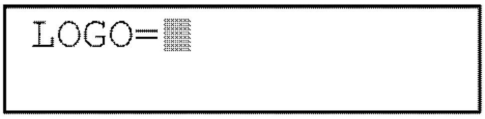
```
SYSTEM SETUP
PRESS NAVI.[◀  ▶]
```

2. Press [◀] or [▶] repeatedly to display the following.

```
YOUR LOGO
      PRESS SET
```

3. Press [SET].

- The cursor (▒) will appear on the display.


LOGO=▒

4. Enter up to 30 characters for your logo. See the character table below for details.

5. Press [SET].

- The next feature will be displayed.

6. Press [MENU] to exit the program.

Note:

- Your logo will be printed on each page transmitted from your unit.

To select characters with the dial keypad

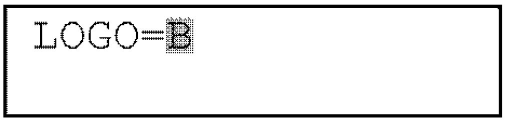
Buttons	**Characters**
[1]	1 [ ] { } + - / =
	, . _ ` : ; ? |
[2]	A B C a b c 2
[3]	D E F d e f 3
[4]	G H I g h i 4
[5]	J K L j k l 5
[6]	M N O m n o 6
[7]	P Q R S p q r s 7
[8]	T U V t u v 8
[9]	W X Y Z w x y z 9
[0]	0 ( ) < > ! " # $
	% & ¥ ∗ @ ^ ' →
[⌗]	To change capital or lower-case letter.
[FLASH]	**Hyphen** button (To insert a hyphen.)
[MUTE]	**Insert** button (To insert one character or one space.)
[STOP]	**Delete** button (To delete a character.)

Note:

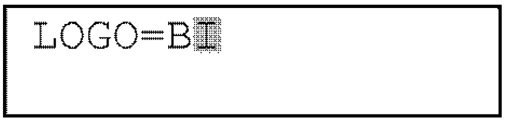
To enter another character located on the same dialing button, press [▶] to move the cursor to the next space.

To enter your logo
Example: "BILL"

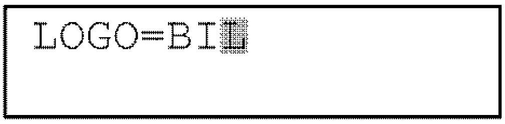
1. Press [2] 2 times.


LOGO=B

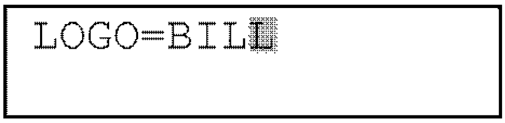
2. Press [4] 3 times.


LOGO=BI

3. Press [5] 3 times.

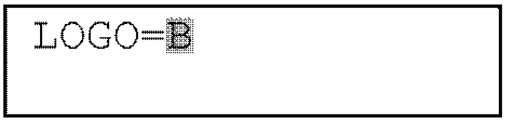

LOGO=BIL

4. Press [▶] to move the cursor to the next space and press [5] 3 times.

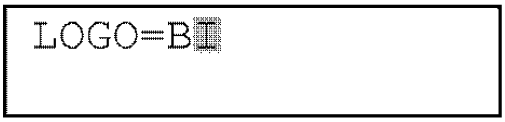

LOGO=BILL

To change capital or lower-case letters
Pressing the [#] button will change to capital or lower-case alternately.

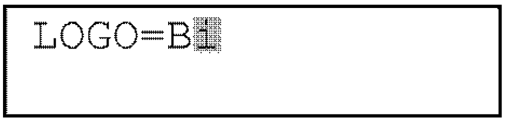
1. Press [2] 2 times.


LOGO=B

2. Press [4] 3 times.

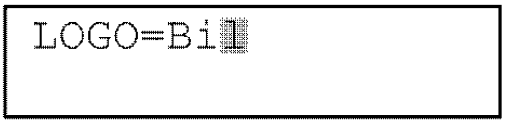

LOGO=BI

3. Press [#] .



```
LOGO=Bi
```

4. Press [5] 3 times.



```
LOGO=Bil
```

To correct a mistake
Press [◀] or [▶] to move the cursor to the incorrect character.

To delete a character
Press [◀] or [▶] to move the cursor to the character you want to delete and press [STOP].
- To erase all of the digits, press and hold [STOP].

To insert a character

1. Press [◀] or [▶] to move the cursor to the position to the right of where you want to insert the character.

2. Press [MUTE] to insert a space and enter the character.

To select characters using [+] or [-]
Instead of using the dial keypad, you can select characters using [+] or [-].

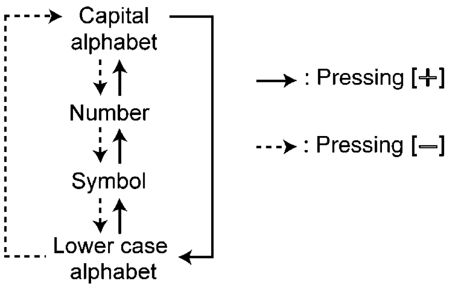
1. Press [+] or [-] repeatedly to display the desired character.

2. Press [▶] to move the cursor to the next space.

- The character displayed is selected.

3. Return to step 1 to enter the next character.

Display order of characters



5. MAINTENANCE

5.1. MAINTENANCE ITEMS AND COMPONENT LOCATIONS

5.1.1. Outline

MAINTENANCE AND REPAIRS ARE PERFORMED USING THE FOLLOWING STEPS.

1. Periodic maintenance
Inspect the equipment periodically and if necessary, clean any contaminated parts.

2. Check for breakdowns
Look for problems and consider how they arose.
If the equipment can be still used, perform copying, self testing or communication testing.

3. Check equipment
Perform copying, self testing and communication testing to determine if the problem originates from the transmitter, receiver or the telephone line.

4. Determine causes
Determine the causes of the equipment problem by troubleshooting.

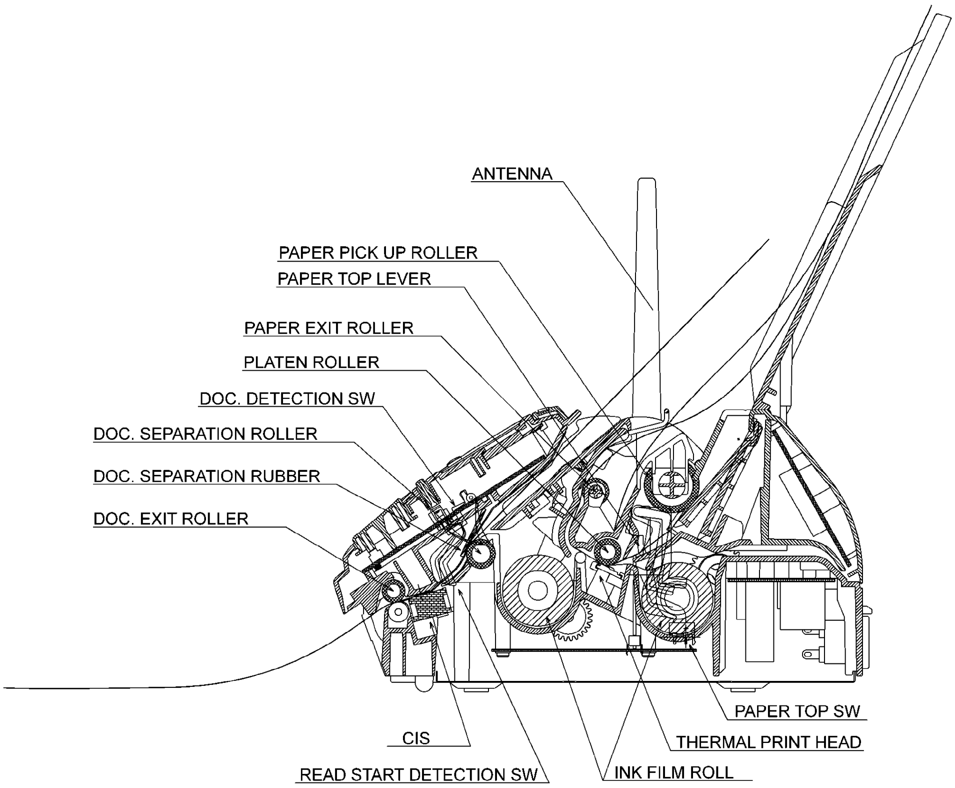
5. Equipment repairs
Repair or replace the defective parts and take appropriate measures at this stage to ensure that the problem will not recur

6. Confirm normal operation of the equipment
After completing the repairs, conduct copying, self testing and communication testing to confirm that the equipment operates normally.

7. Record keeping

Make a record of the measures taken to rectify the problem for future reference.

5.1.2. Maintenance Check Items/Component Locations


ANTENNA
PAPER PICK UP ROLLER
PAPER TOP LEVER
PAPER EXIT ROLLER
PLATEN ROLLER
DOC. DETECTION SW
DOC. SEPARATION ROLLER
DOC. SEPARATION RUBBER
DOC. EXIT ROLLER
CIS
READ START DETECTION SW
INK FILM ROLL
THERMAL PRINT HEAD
PAPER TOP SW

5.1.2.1. Maintenance List

NO.	OPERATION	CHECK	REMARKS
1	Document Path	Remove any foreign matter such as paper.	—
2	Rollers	If the roller is dirty, clean it with a damp cloth then dry thoroughly.	Refer to Document Feeder
3	Platen Roller	If the platen is dirty, clean it with a damp cloth then dry thoroughly. Remove the paper and film cartridge before cleaning.	—
4	Thermal Head	If the thermal head is dirty, clean the printing surface with a cloth moistened with denatured alcohol (alcohol without water), then dry thoroughly.	Refer to Thermal Head Clea
5	Sensors	Paper top sensor (SW402), Film end/Cover open switch (SW401), Document top switch (SW351), Document set sensor (PS301), Film detection switch (SW401). Confirm the operation of the sensors.	See Maintenance Check Ite Component Locations() and Remove the Digital, Analog, Supply, Sensor Boards and ().
6	Glass	If the glass is dirty, clean them with a dry soft cloth.	Refer to Document Feeder
7	Abnormal, wear and tear or loose parts	Replace the part. Check if the screws are tight on all parts.	—

5.1.2.2. Maintenance Cycle

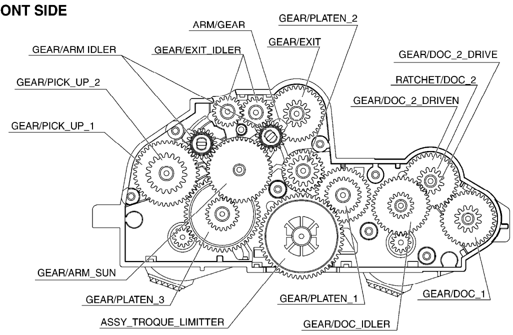
No.	Item	Cleaning Cycle	Replacement	
			Cycle	Procedure
1	Separation Roller (Ref. No. 169)	3 months	7 years* (31,500 documents)	Refer to How to Remove th Block and Separation Roll
2	Separation Rubber (Ref. No. 16)	3 months	7 years (31,500 documents)	Refer to Document Feeder ().
3	Feed Rollers (Ref. No. 21, 59, 83)	3 months	7 years (31,500 documents)	Refer to DISASSEMBLY INSTRUCTIONS().
4	Thermal Head (Ref. No. 44)	3 months	7 years (31,500 documents)	Refer to How to Remove th Thermal Head().
5	Platen Roller (Ref. No. 90)	3 months	7 years (31,500 documents)	Refer to How to Remove th Cover().
6	Pickup Roller (Ref. No. 133)	3 months	7 years (31,500 documents)	Refer to How to Remove th Roller().

5.2. GEAR SECTION

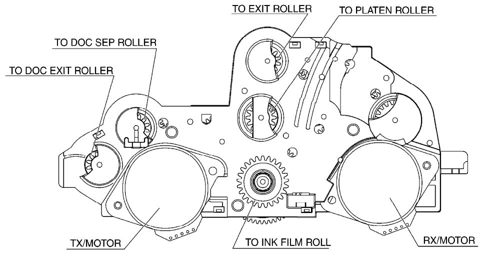
5.2.1. Gear Operation

Once a mode is selected, the Drive Motor Gear rotates clockwise (CW) and then the controlling positions of Swing Gears determine which gears convey their drive power in each mode. See "Sensor Location" in SENSORS AND SWITCHES ().

FRONT SIDE


ARM/GEAR
GEAR/PLATEN_2
GEAR/EXIT
GEAR/ARM IDLER
GEAR/EXIT_IDLER
GEAR/DOC_2_DRIVE
GEAR/PICK_UP_2
RATCHET/DOC_2
GEAR/DOC_2_DRIVEN
GEAR/PICK_UP_1
GEAR/ARM_SUN
GEAR/PLATEN_3
GEAR/PLATEN_1
GEAR/DOC_1
ASSY_TROQUE_LIMITTER
GEAR/DOC_IDLER

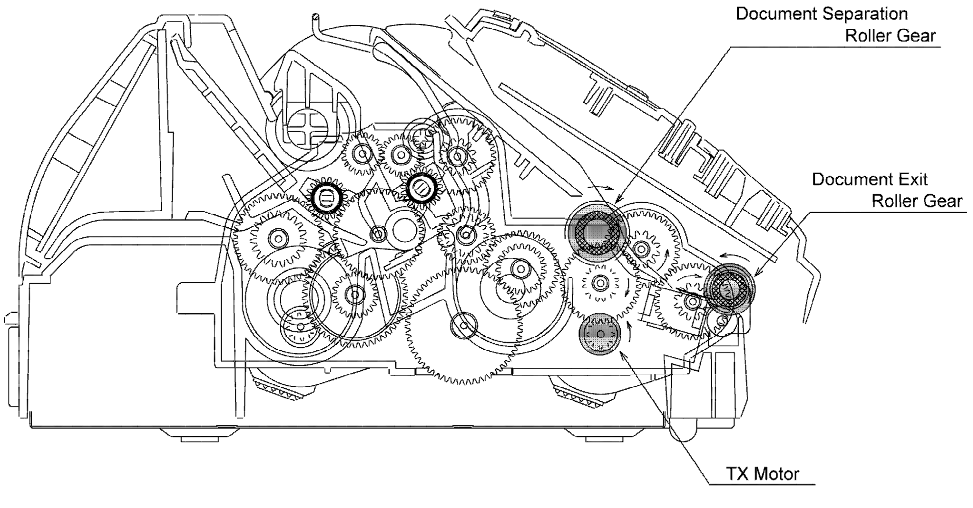
BACK SIDE


TO EXIT ROLLER
TO PLATEN ROLLER
TO DOC SEP ROLLER
TO DOC EXIT ROLLER
TX/MOTOR
TO INK FILM ROLL
RX/MOTOR

5.2.1.1. Transmit Mode

The TX Motor rotate CCW (counterclockwise) and conveys its power to the Document Separation Roller Gear and Document Exit Roller Gear.

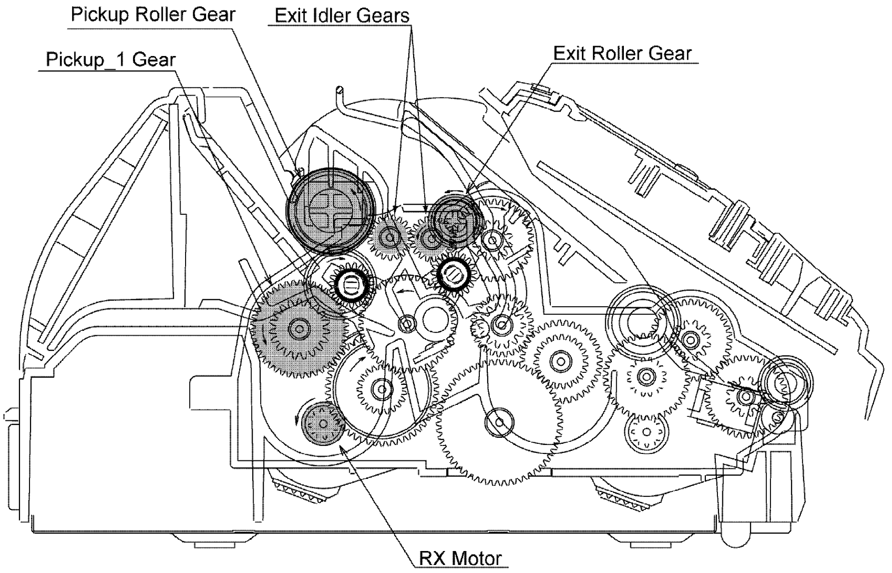
Fig. A: Transmit mode


Document Separation
Roller Gear
Document Exit
Roller Gear
TX Motor

5.2.1.2. Paper Pickup and Paper Exit Mode

The RX Motor rotate CCW and swing Gear engages Pickup_1 Gear, and conveys its power to the Pickup Roller Gear. The Swing Gear engages Exit Idler Gears, and conveys its power to the Exit Roller Gear.

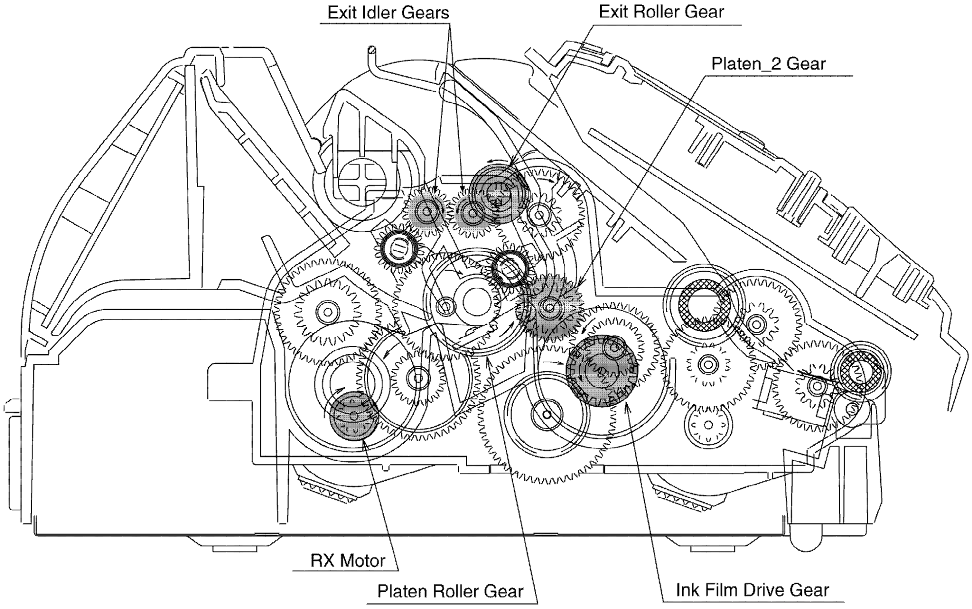
Fig. B: Paper Pickup / Paper Exit mode


Pickup Roller Gear
Exit Idler Gears
Pickup_1 Gear
Exit Roller Gear
RX Motor

5.2.1.3. Print Mode

The RX Motor rotate CW and Swing Gear engages Platen_2 Gear, and conveyers its power to Platen Roller Gear and Ink Film Driver Gear.
The Swing Gear engages Exit Idler Gears, and conveys its power to the Exit Roller Gear.

Fig. C: Print mode


Exit Idler Gears
Exit Roller Gear
Platen_2 Gear
RX Motor
Platen Roller Gear
Ink Film Drive Gear

5.2.1.4. Copy Mode

RX side: Paper Pickup mode → Print mode → Paper Exit mode.
TX side: Transmit mode.

5.3. JAMS

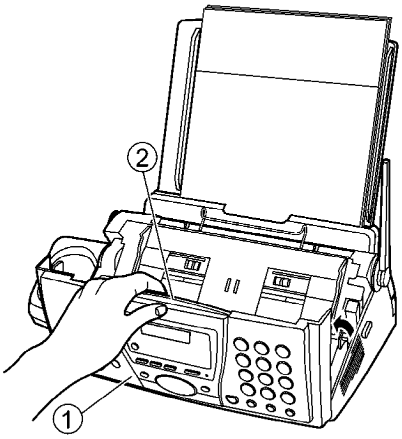
5.3.1. Recording Paper Jams

5.3.1.1. When the recording paper has jammed in the unit

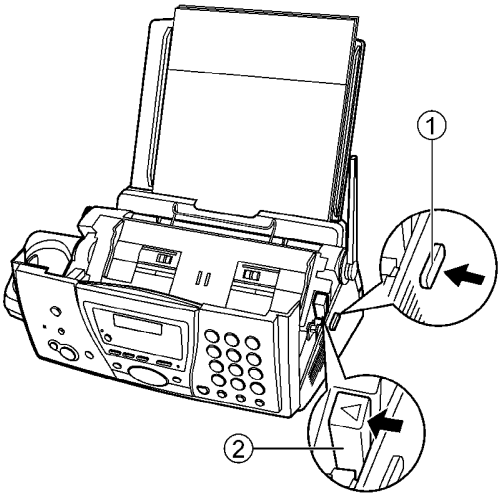
The display will show the following.

PAPER JAMMED

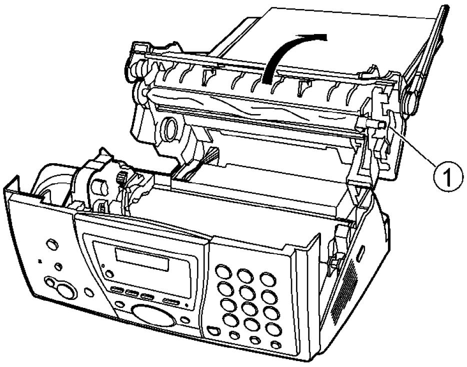
1. **Open the front cover (①) by pulling up the center part (②).**



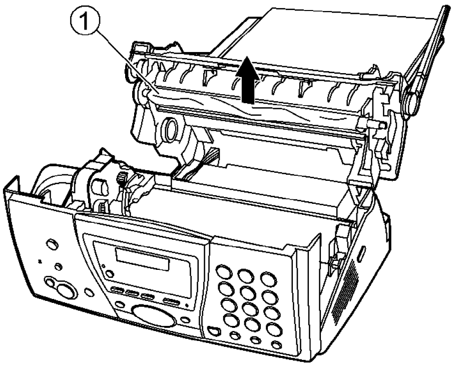
2. **Release the back cover by pushing the green button (①) on the right side of the unit.**
   OR
   Release the back cover by pushing in the green lever (②) in the unit.



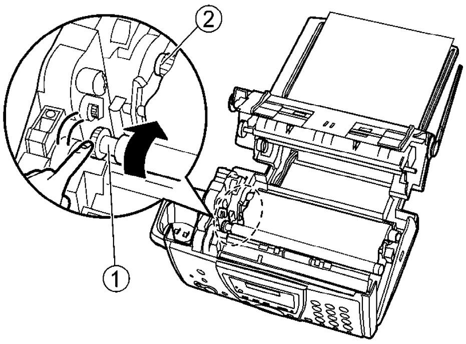
3. Open the back cover (①).



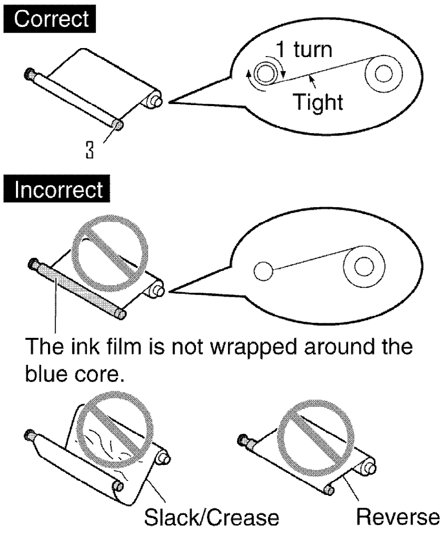
4. Remove the jammed recording paper (①).



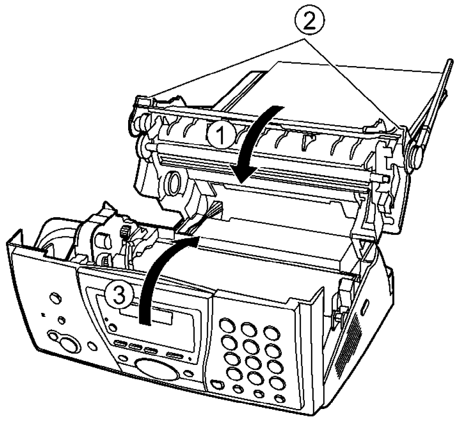
5. Turn the gear of the blue core (①) in the direction of the arrow until the white core (②) begins to turn.



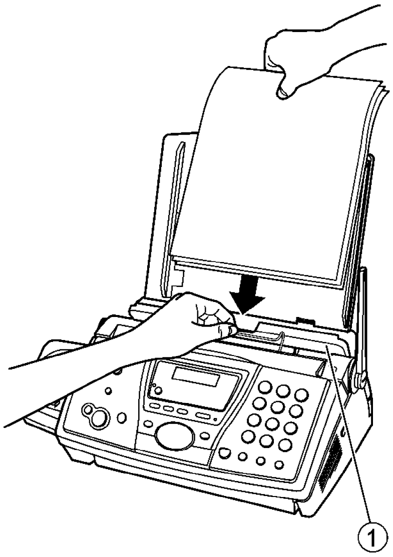
- **Make sure that the ink film is wrapped around the blue core (③) at least once.**


Correct
1 turn
Tight
3
Incorrect
The ink film is not wrapped around the blue core.
Slack/Crease
Reverse

6. **First close the back cover securely (①) by pushing down on the dotted area at both sides (②).**
   Then close the front cover securely (③).



7. **Remove the recording paper and straighten. Pull the tension plate forward (①) and insert the paper. Then push the tension plate back.**

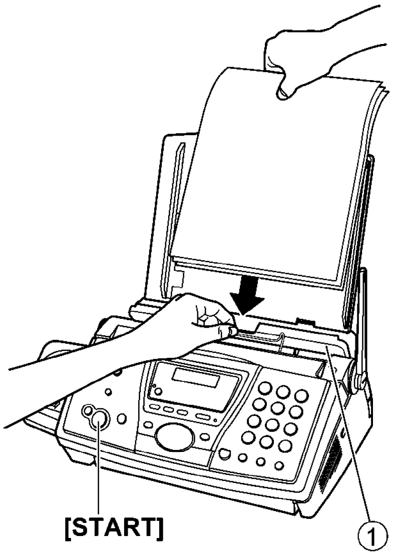


5.3.1.2. When the recording paper was not fed into the unit properly

The display will show the following.

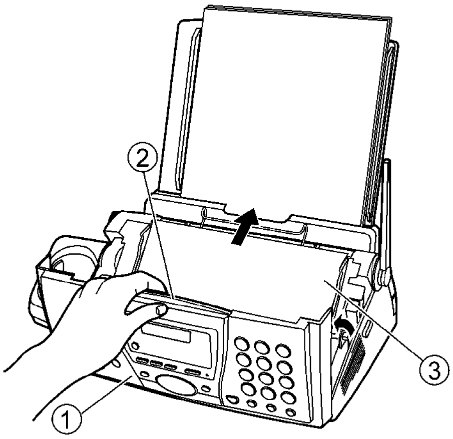
```
CHECK PAPER
```

Remove the recording paper and straighten. Pull the tension plate forward (①) and insert the paper. Push the tension plate back, then press [START] to clear the message.

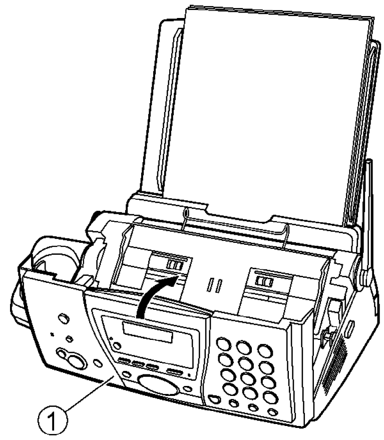


5.3.2. Document Jams - sending

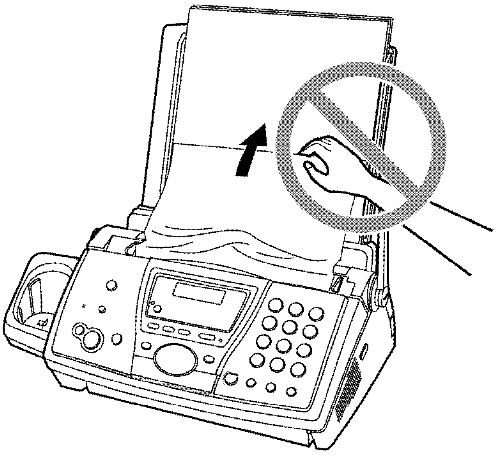
1. Open the front cover (①) by pulling up the center part (②). Remove the jammed document carefully (③).



2. Close the front cover securely (①).



Note:
Do not pull out the jammed paper forcibly before opening the front cover.

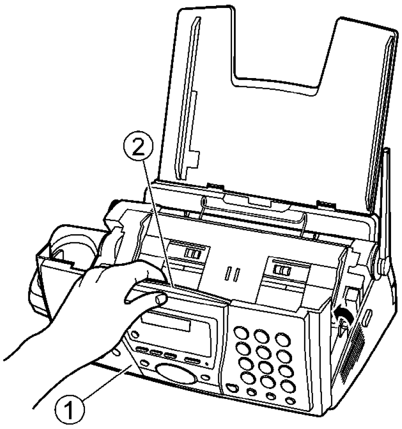


5.4. CLEANING

5.4.1. Document Feeder Cleaning

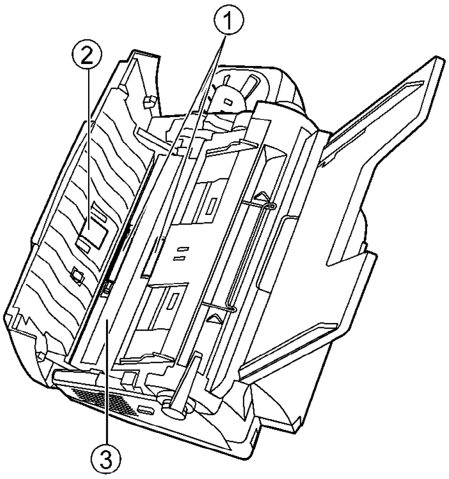
Clean the document feeder in the following cases:
— If misfeeding of the document occurs frequently.
— If smudges or black/white lines appear on the original document when transmitting or copying.

1. **Disconnect the power cord and the telephone line cord.**
2. **Open the front cover (①) by pulling up the center part (②).**

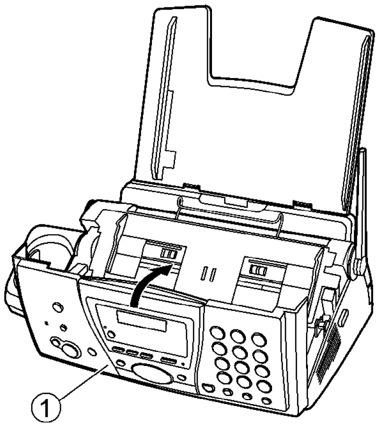


3. **Clean the document feeder rollers (①) and rubber flap (②) with a cloth moistened with isopropyl rubbing alcohol, and let all parts dry thoroughly. Clean the glass (③) with a soft, dry cloth.**
   Caution:

- Do not use paper products, such as paper towels or tissues.



4. Close the front cover securely (①).

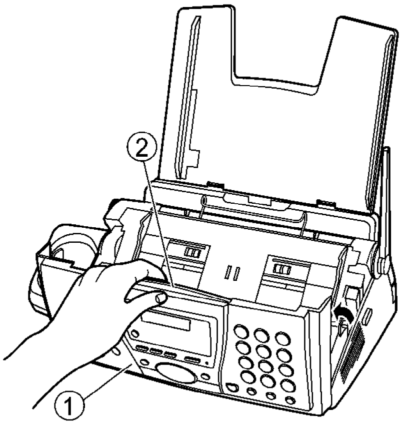


5. Connect the power cord and the telephone line cord.

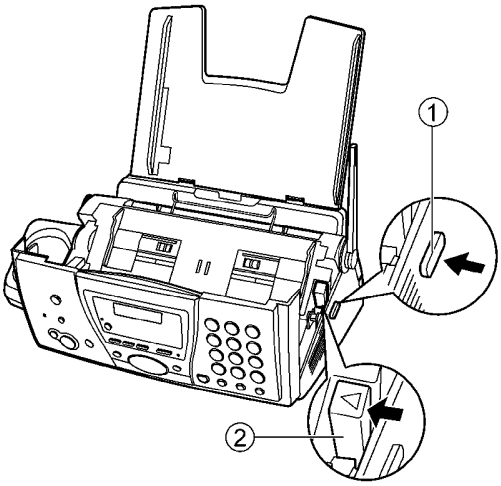
5.4.2. Thermal Head Cleaning

If smudges or black/white lines appear on a copied/received document, check for dust on the thermal head. Clean the thermal head to remove the dust.

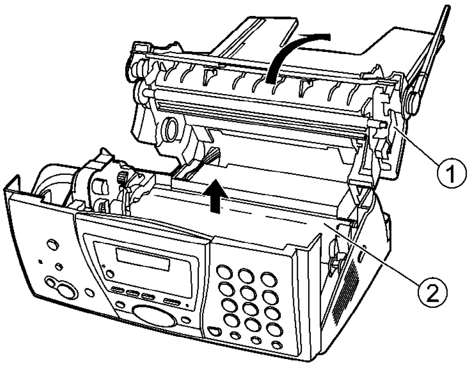
1. Disconnect the power cord and the telephone line cord.
2. Open the front cover (①) by pulling up the center part (②).



3. Release the back cover by pushing the green button (①) on the right side of the unit.
   OR
   Release the back cover by pushing the green lever (②) in the unit.



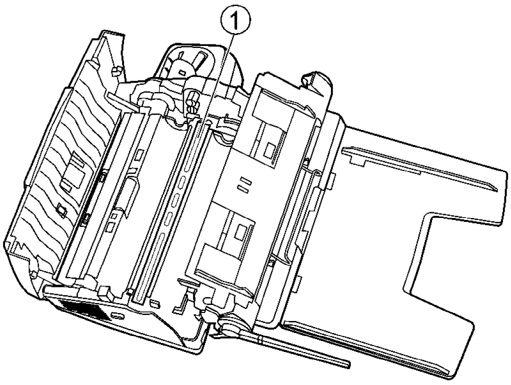
4. **Open the back cover (①). Remove the ink film (②).**



5. **Clean the thermal head (①) with a cloth moistened with isopropyl rubbing alcohol, and let it dry thoroughly.**

   Caution:

- **To prevent a malfunction due to static electricity, do not use a dry cloth and do not touch the thermal head directly.**



6. **Reinstall the ink film and close the covers (see steps 4 to 6 on**

INSTALLING THE INK FILM ()).

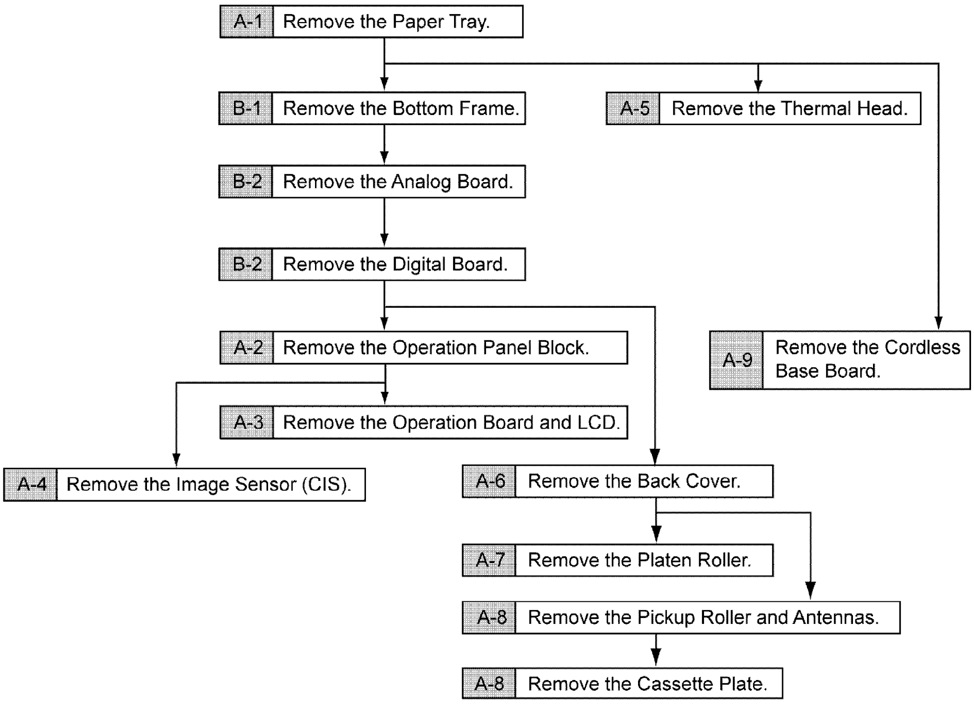
7. Connect the power cord and the telephone line cord.

6. DISASSEMBLY INSTRUCTIONS

Before disassembling, remove the ink film.

6.1. DISASSEMBLY FLOWCHART

6.1.1. Upper Cabinet Section


A-1 Remove the Paper Tray.
B-1 Remove the Bottom Frame.
A-5 Remove the Thermal Head.
B-2 Remove the Analog Board.
B-2 Remove the Digital Board.
A-2 Remove the Operation Panel Block.
A-9 Remove the Cordless Base Board.
A-3 Remove the Operation Board and LCD.
A-4 Remove the Image Sensor (CIS).
A-6 Remove the Back Cover.
A-7 Remove the Platen Roller.
A-8 Remove the Pickup Roller and Antennas.
A-8 Remove the Cassette Plate.

CROSS REFERENCE:

A-1: How to Remove the Paper Tray ()

A-2: How to Remove the Operation Panel Block()

A-3: How to Remove the Operation Board and LCD()

A-4: How to Remove the Image Sensor (CIS)()

A-5: How to Remove the Thermal Head()

A-6: How to Remove the Back Cover()

A-7: How to Remove the Platen Roller()

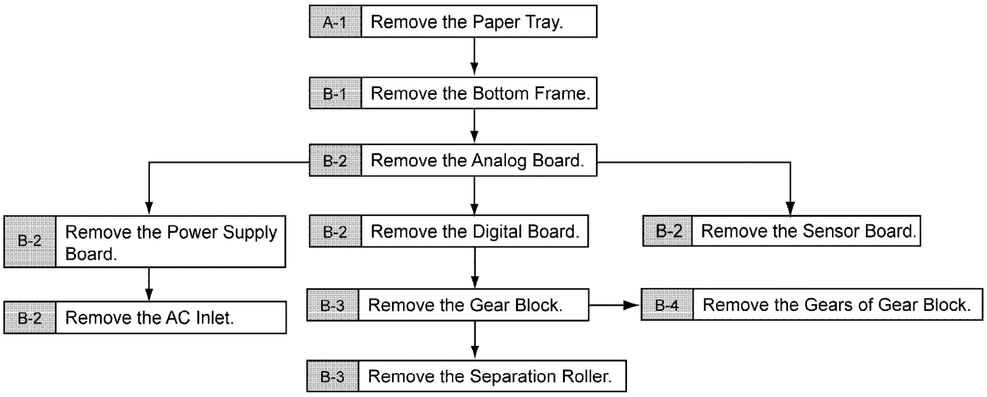
A-8: How to Remove the Pickup Roller and Antenna()

A-9: How to Remove the Cordless Base Board()

B-1: How to Remove the Bottom Frame()

B-2: How to Remove the Digital, Analog, Power Supply, Sensor Boards and AC Inlet()

6.1.2. Lower Cabinet Section


A-1 Remove the Paper Tray.
B-1 Remove the Bottom Frame.
B-2 Remove the Analog Board.
B-2 Remove the Power Supply Board.
B-2 Remove the Digital Board.
B-2 Remove the Sensor Board.
B-2 Remove the AC Inlet.
B-3 Remove the Gear Block.
B-4 Remove the Gears of Gear Block.
B-3 Remove the Separation Roller.

CROSS REFERENCE:

A-1: How to Remove the Paper Tray ()

A-2: How to Remove the Operation Panel Block()

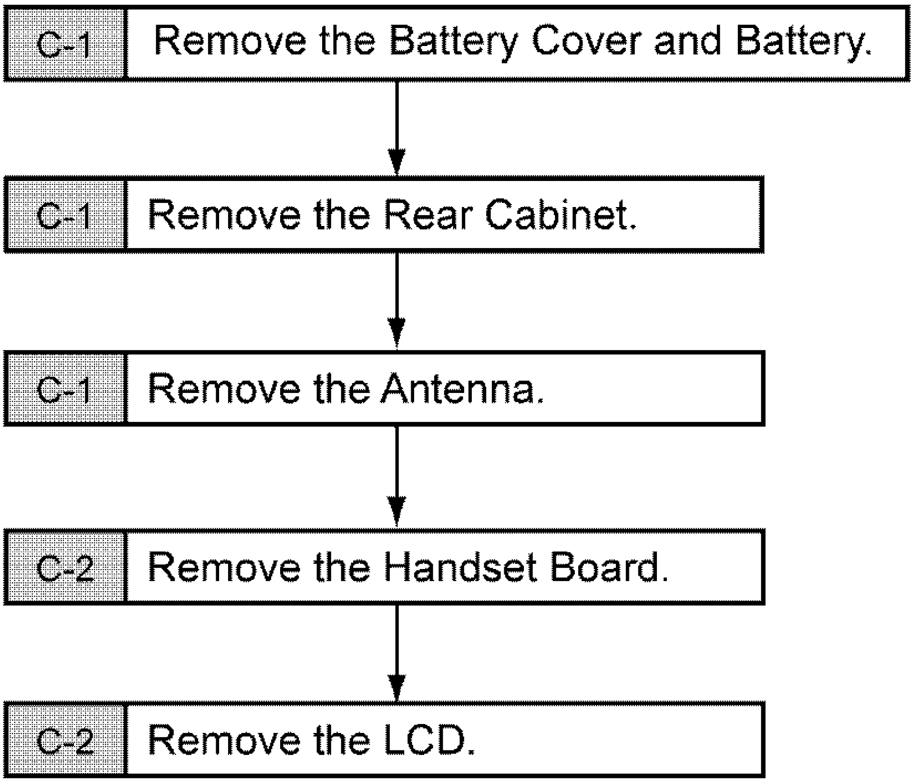
B-1: How to Remove the Bottom Frame()

B-2: How to Remove the Digital, Analog, Power Supply, Sensor Boards and AC Inlet()

B-3: How to Remove the Gear Block and Separation Roller()

B-4: How to Remove the Gears, Motors and Arms of the Gear Block()

6.1.3. Portable Handset Section


C-1 Remove the Battery Cover and Battery.
C-1 Remove the Rear Cabinet.
C-1 Remove the Antenna.
C-2 Remove the Handset Board.
C-2 Remove the LCD.

CROSS REFERENCE:

C-1: How to Remove the Antenna of Handset()
C-2: How to Remove the Handset Board and LCD()

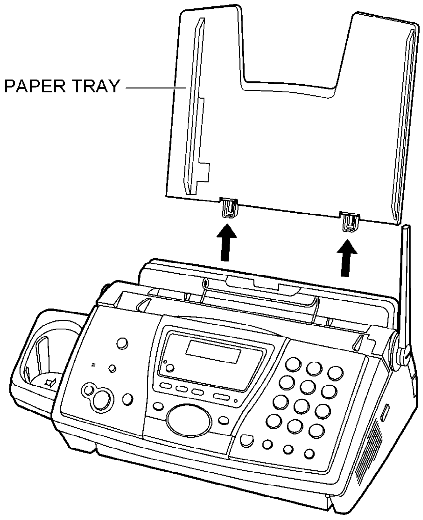
6.2. DISASSEMBLY PROCEDURE

6.2.1. How to Remove the Paper Tray

PROCEDURE: A-1

Ref. No. A-1

1) Remove the PAPER TRAY in the direction of the arrow.

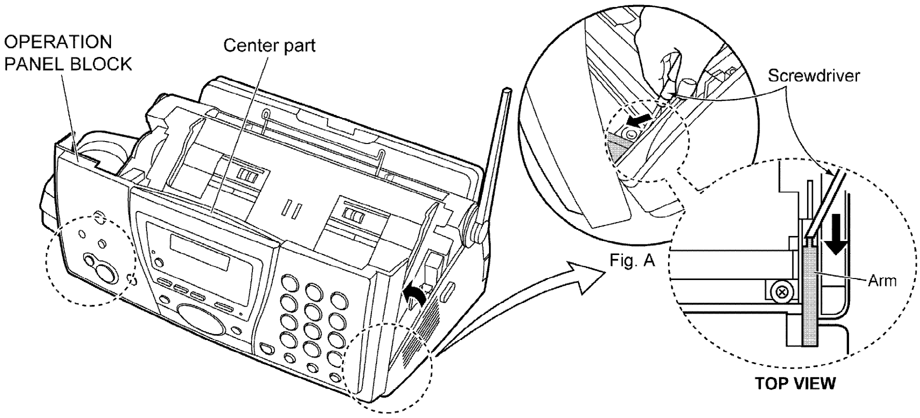


6.2.2. How to Remove the Operation Panel Block

PROCEDURE: A-1 → B-1 → B-2 → A-2

Ref. No. A-2

1) Unhook all the connectors connecting the main cabinet with the OPERATION PANEL BLOCK. (Ref No. B-2)
2) Open the OPERATION PANEL BLOCK by pulling up the center part.
3) Pull out both sides of the arms. (Fig. A)
4) Remove the OPERATION PANEL BLOCK.

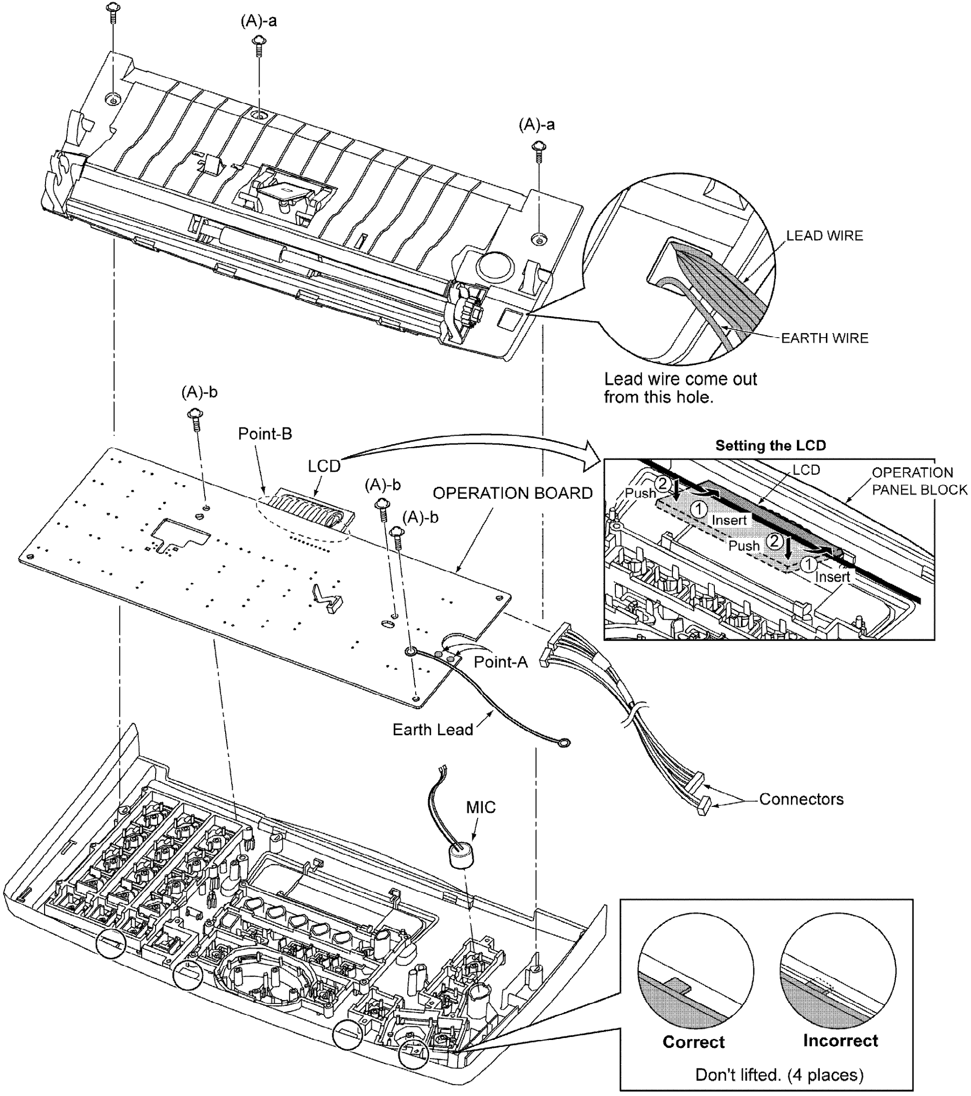

OPERATION
PANEL BLOCK
Center part
Screwdriver
Fig. A
Arm
TOP VIEW

6.2.3. How to Remove the Operation Board and LCD

PROCEDURE: A-1 → B-1 → B-2 → A-2 → A-3

Ref. No. A-3

1) Remove the 3 screws (A)-a.
2) Remove the OPERATION PANEL COVER.
3) Remove the 3 screws (A)-b.
4) Disconnect the Connectors.
4) Resolder the Point-A .
5) Remove the OPERATION BOARD.
6) Resolder the Point-B.
7) Remove the LCD.

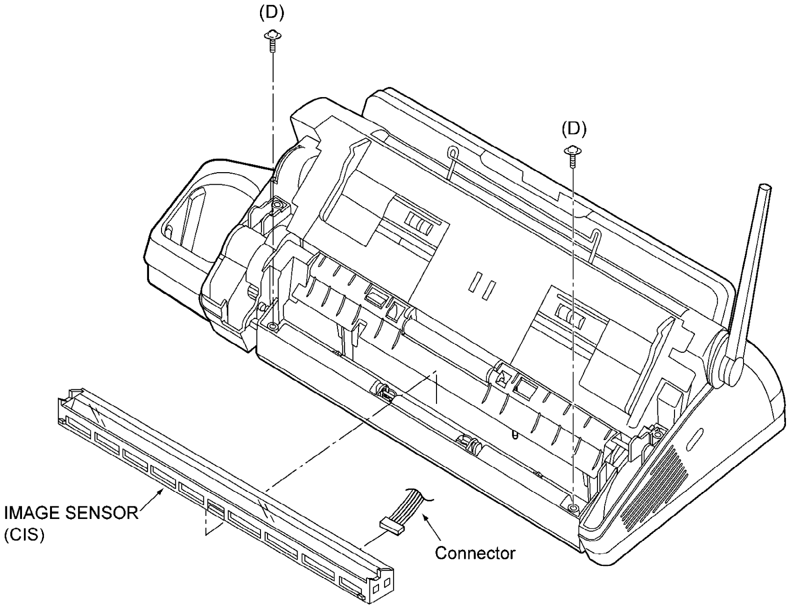

(A)-a
(A)-a
(A)-a
LEAD WIRE
EARTH WIRE
Lead wire come out from this hole.
(A)-b
Point-B
LCD
(A)-b
(A)-b
OPERATION BOARD
Setting the LCD
LCD
OPERATION PANEL BLOCK
Push
②
①
Insert
Push
②
①
Insert
Point-A
Earth Lead
MIC
Connectors
Correct
Incorrect
Don't lifted. (4 places)

6.2.4. How to Remove the Image Sensor (CIS)

PROCEDURE: A-1 → B-1 → B-2 → A-2 → A-4

Ref. No. A-4

1) Remove the 2 screws (D).
2) Pull out the IMAGE SENSOR (CIS).
3) Remove the Connector.

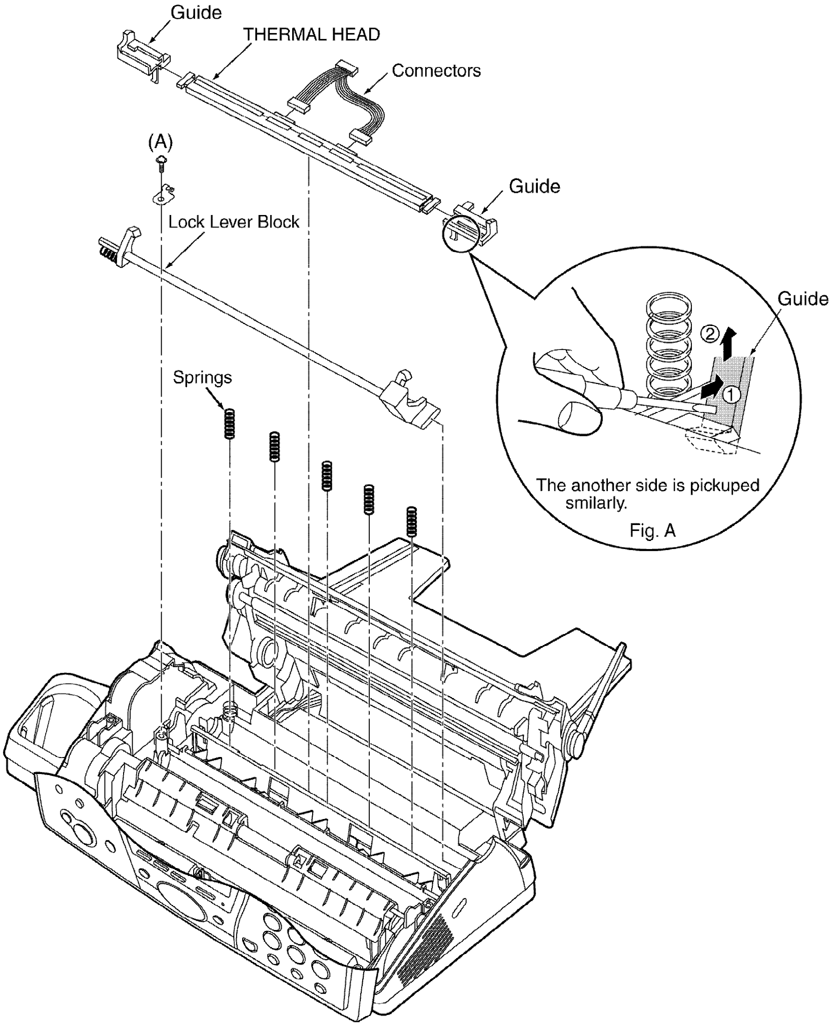

(D)
(D)
IMAGE SENSOR
(CIS)
Connector

6.2.5. How to Remove the Thermal Head

PROCEDURE: A-1 → A-5

Ref. No. A-5

1) Open the front cover by pulling up the center part.
2) Open back cover by pushing the green button (back cover release button).
3) Remove the screw (A).
4) Remove the Lock Lever Block.
5) Release the 2 Guides and Thermal Head Block. (Fig. A)
6) Remove the 2 Guides, 5 Springs and 2 Connectors.
7) Remove the THERMAL HEAD.

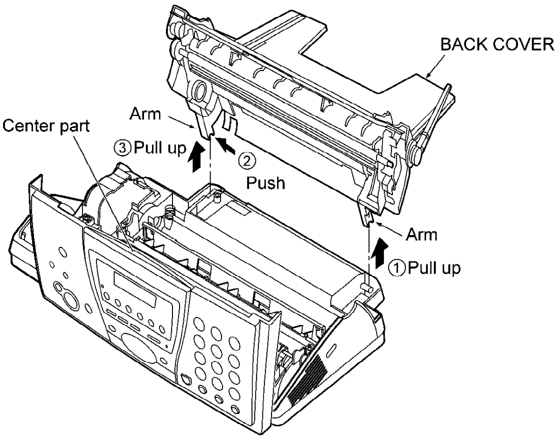

Guide
THERMAL HEAD
Connectors
(A)
Guide
Lock Lever Block
Guide
②
①
Springs
The another side is pickuped smilarly.
Fig. A

6.2.6. How to Remove the Back Cover

PROCEDURE: A-1 → B-1 → B-2 → A-6

Ref. No. A-6

1) Unhook all the connectors connecting the main cabinet with the BACK COVER. (Ref No. B-2).
2) Open the front cover by pulling up the center part.
3) Open back cover by pushing the green button (back cover release button).
4) The right side Arm is released first, and then the an other side.
5) Remove the BACK COVER.


BACK COVER
Arm
Center part
③Pull up
②
Push
Arm
①Pull up

6.2.7. How to Remove the Platen Roller

PROCEDURE: A-1 → B-1 → B-2 → A-6 → A-7

Ref. No. A-7

1) Release the Spacer and remove the Platen Roller Block. (Fig. A)
2) Release the Stopper and remove the Gear. (Fig. B)
3) Remove the PLATEN ROLLER.

CLEANING:
Clean the roller with a cloth soaked in alcohol.

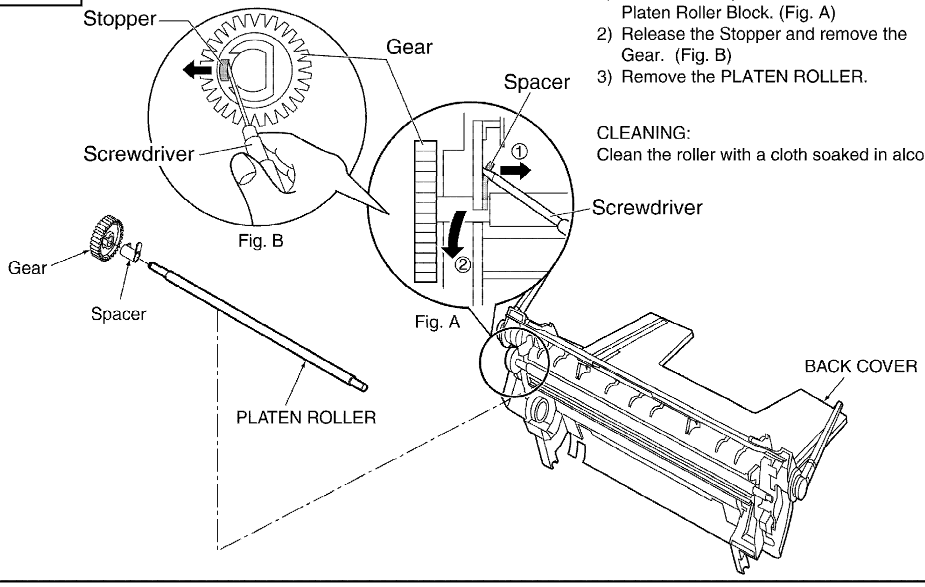

Stopper
Gear
Spacer
Screwdriver
①
Screwdriver
②
Gear
Spacer
PLATEN ROLLER
BACK COVER

Fig. B

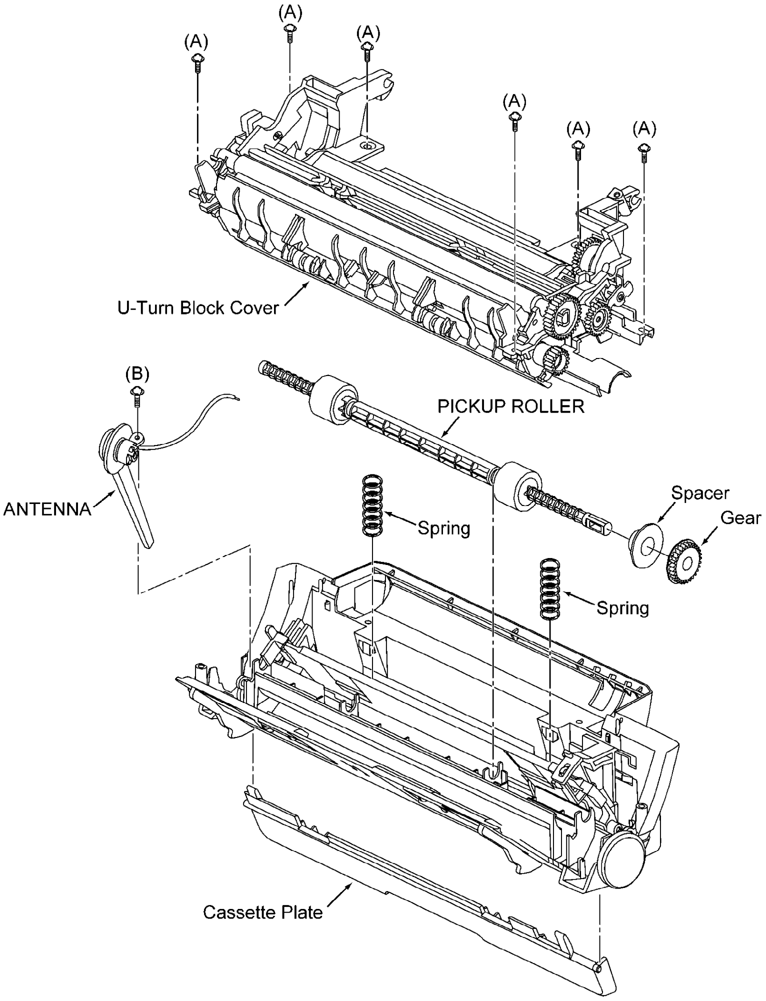
Fig. A

6.2.8. How to Remove the Pickup Roller and Antenna

PROCEDURE: A-1 → B-1 → B-2 → A-6 → A-8

Ref. No. A-8

1) Remove the 6 screws (A).
2) Remove the U-Turn Block Cover.
3) Remove the 2 Springs.
4) Remove the Gear and Spacer.
5) Remove the PICKUP ROLLER.
6) Remove the 2 screws (B).
7) Remove the ANTENNA.


(A)
(A)
(A)
(A)
(A)
(A)
U-Turn Block Cover
(B)
PICKUP ROLLER
ANTENNA
Spring
Spacer
Gear
Spring
Cassette Plate

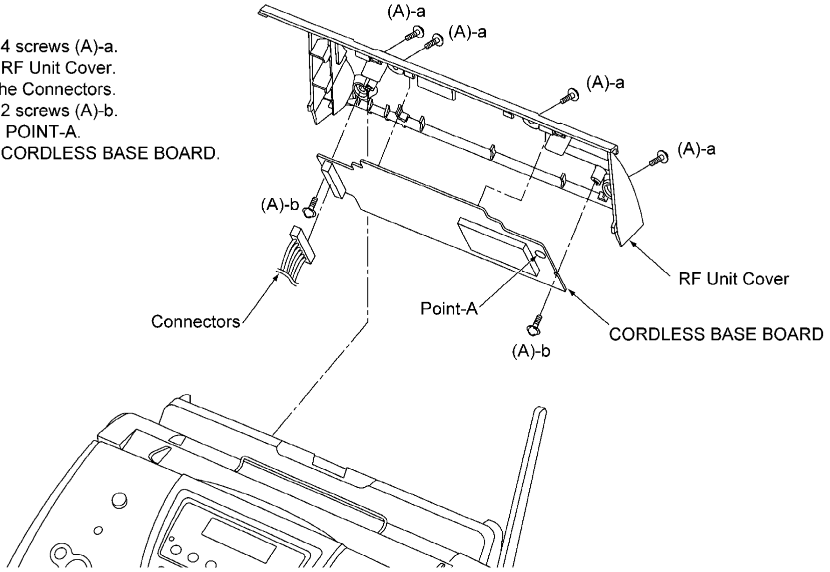
CLEANING:
Clean the roller with
a cloth soaked in alcohol.

6.2.9. How to Remove the Cordless Base Board

PROCEDURE: A-1 → A-9

Ref. No. A-9

1) Remove the 4 screws (A)-a.
2) Remove the RF Unit Cover.
3) Disconnect the Connectors.
4) Remove the 2 screws (A)-b.
5) Resolder the POINT-A.
6) Remove the CORDLESS BASE BOARD.

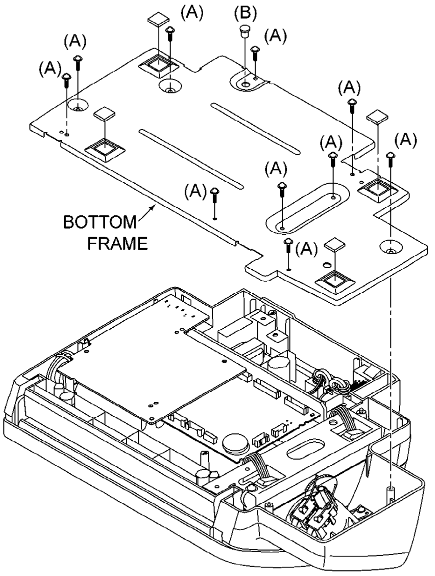

(A)-a
(A)-a
(A)-a
(A)-a
(A)-b
RF Unit Cover
Connectors
Point-A
CORDLESS BASE BOARD
(A)-b

6.2.10. How to Remove the Bottom Frame

PROCEDURE: A-1 → B-1

Ref. No. B-1

1) Remove the 10 screws (A).
2) Remove the 1 screw (B).
3) Remove the BOTTOM FRAME.


(A)
(B)
(A)
(A)
(A)
(A)
(A)
(A)
(A)
(A)
(A)
BOTTOM
FRAME
(A)

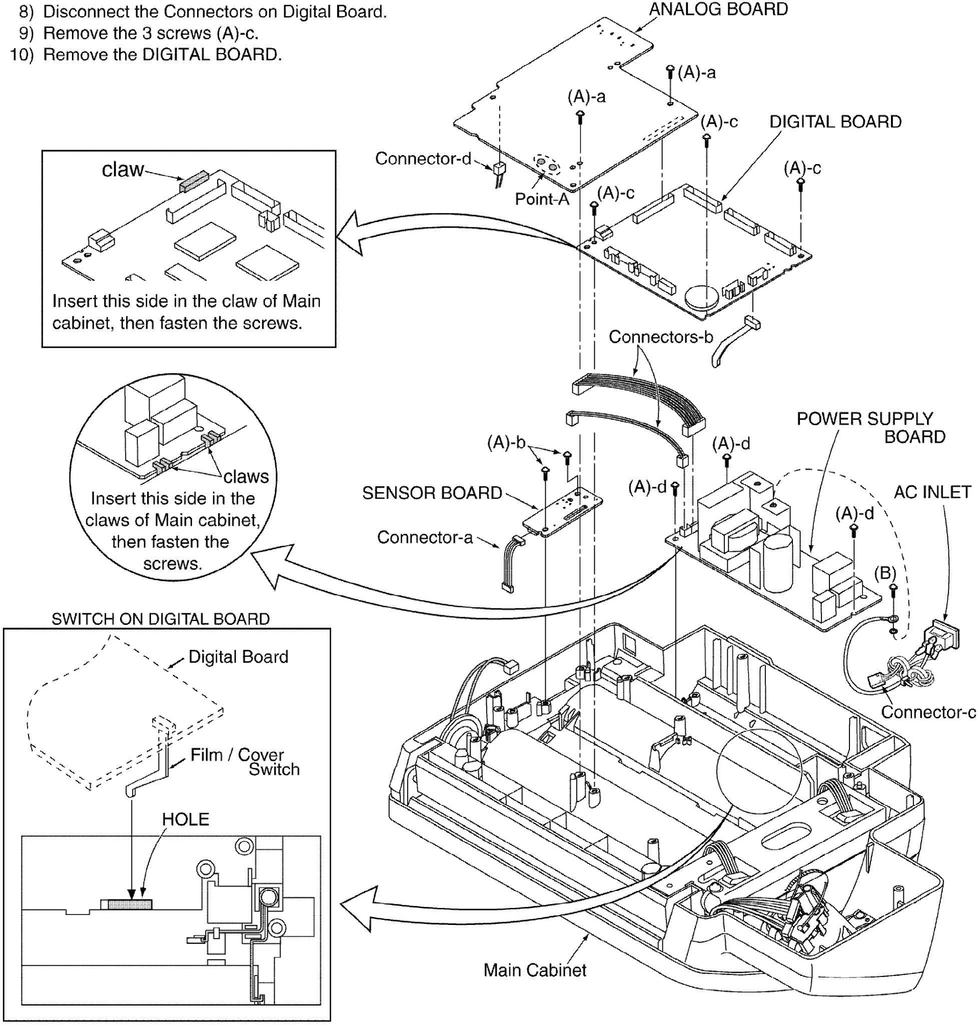
6.2.11. How to Remove the Digital, Analog, Power Supply, Sensor Boards and AC Inlet

PROCEDURE: A-1 → B-1 → B-2

Ref. No. B-2

1) Remove the 2 screws (A)-a.
2) Resolder the Point-A.
3) Disconnect the Connector-d.
4) Remove the ANALOG BOARD.
5) Remove the 2 screws (A)-b.
6) Disconnect the Connector-a.
7) Remove the SENSOR BOARD.
8) Disconnect the Connectors on Digital Board.
9) Remove the 3 screws (A)-c.
10) Remove the DIGITAL BOARD.

1) Disconnect the Connector-b and Connector-c.
2) Remove the 3 screws (A)-d and screw (B).
3) Remove the POWER SUPPLY BOARD.
(Please be careful about the lead wires of AC INLET.)
4) Remove the AC INLET.


ANALOG BOARD
(A)-a
(A)-a
(A)-c
DIGITAL BOARD
(A)-c
Connector-d
Point-A
(A)-c
claw
Connectors-b
POWER SUPPLY BOARD
(A)-b
(A)-d
claws
SENSOR BOARD
(A)-d
AC INLET
(A)-d
Connector-a
(B)
SWITCH ON DIGITAL BOARD
Digital Board
Film / Cover Switch
HOLE
Connector-c
Main Cabinet

Insert this side in the claw of Main cabinet, then fasten the screws.

Insert this side in the claws of Main cabinet, then fasten the screws.

6.2.12. How to Remove the Gear Block and Separation Roller

PROCEDURE: A-1 → B-1 → B-2 → B-3

Ref. No. B-3

1) Remove the 4 screws (A).
2) Remove the GEAR BLOCK.
3) Remove the Shaft and SEPARTION ROLLER. (Fig. A)

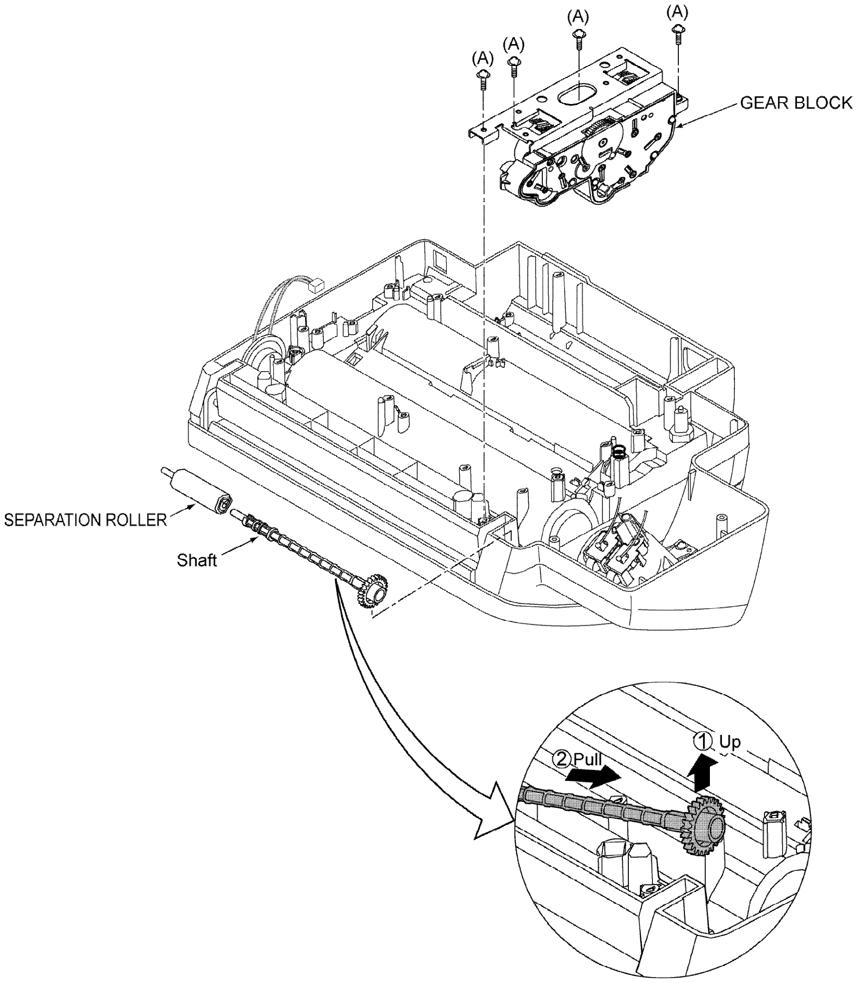
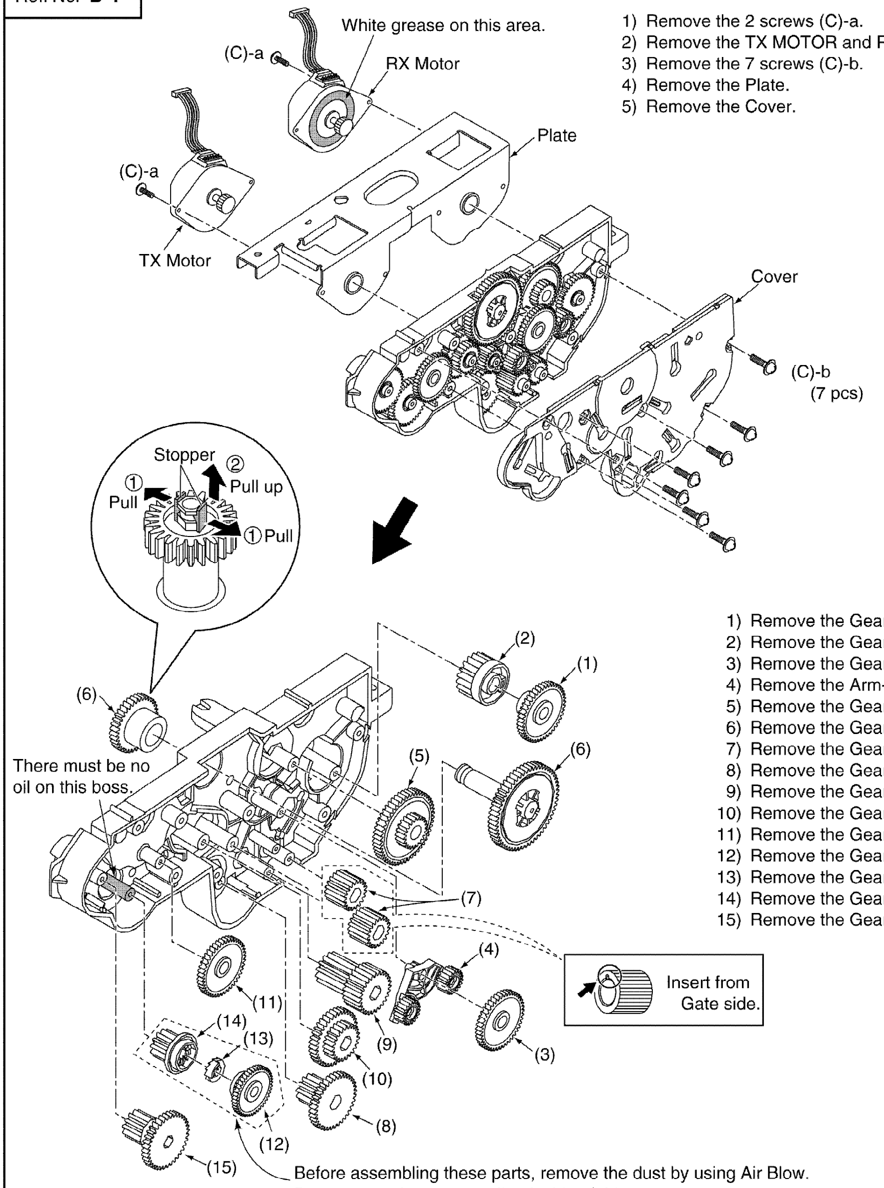

(A)
(A)
(A)
(A)
GEAR BLOCK
SEPARATION ROLLER
Shaft
②Pull
①Up

Fig. A

6.2.13. How to Remove the Gears, Motors and Arms of the Gear Block

PROCEDURE: A-1 → B-1 → B-2 → B-3 → B-4

Ref. No. **B-4**

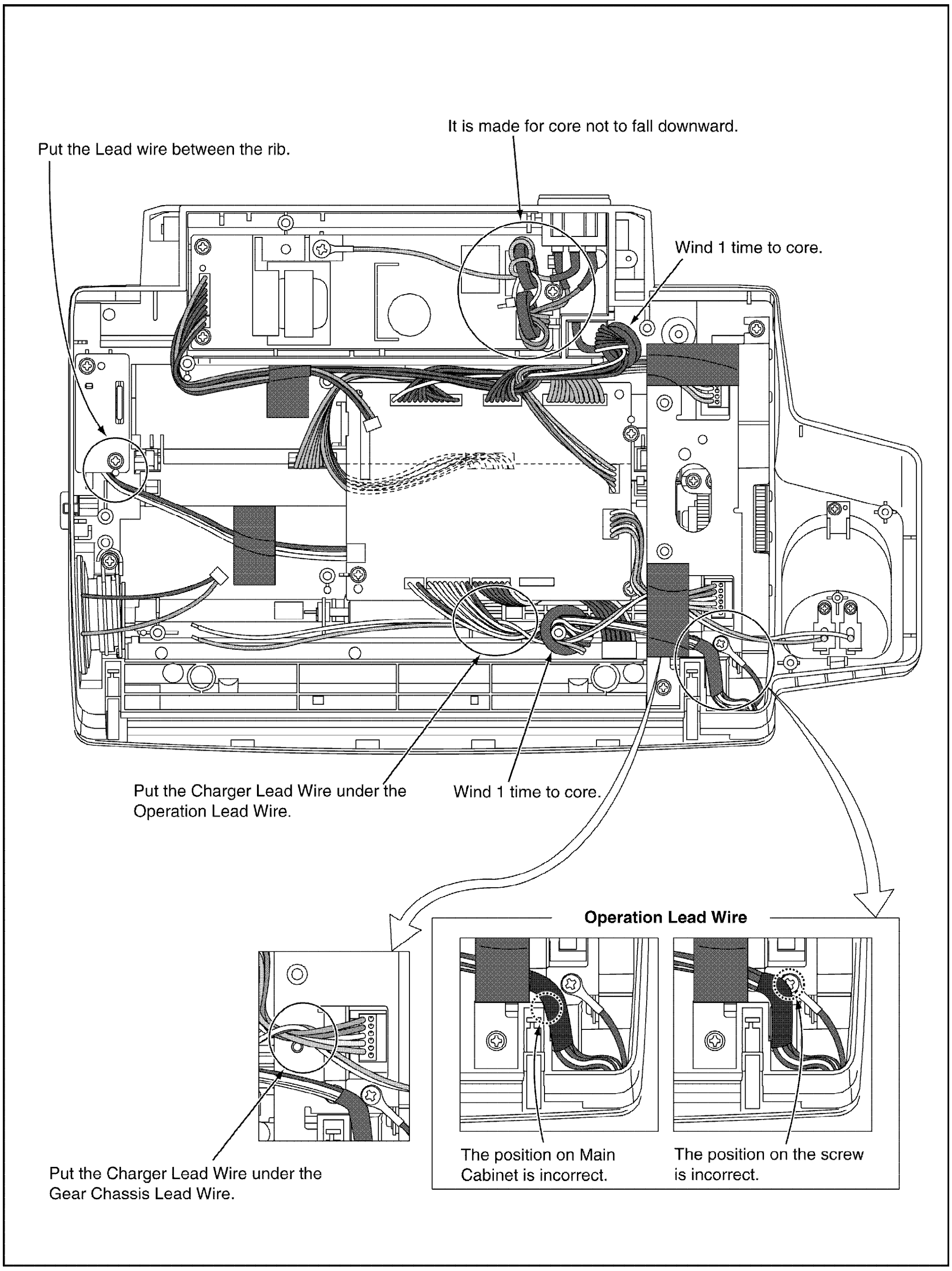

White grease on this area.
(C)-a
RX Motor
(C)-a
Plate
TX Motor
Cover
(C)-b
(7 pcs)
Stopper
① Pull
② Pull up
① Pull
(6)
There must be no oil on this boss.
(2)
(1)
(5)
(6)
(7)
(4)
Insert from Gate side.
(11)
(14)
(13)
(9)
(3)
(10)
(8)
(12)
(15)

1) Remove the 2 screws (C)-a.
2) Remove the TX MOTOR and RX MOTOR.
3) Remove the 7 screws (C)-b.
4) Remove the Plate.
5) Remove the Cover.

1) Remove the Gear-(1).
2) Remove the Gear-(2).
3) Remove the Gear-(3).
4) Remove the Arm-(4).
5) Remove the Gear-(5).
6) Remove the Gear-(6).
7) Remove the Gear-(7).
8) Remove the Gear-(8).
9) Remove the Gear-(9).
10) Remove the Gear-(10).
11) Remove the Gear-(11).
12) Remove the Gear-(12).
13) Remove the Gear-(13).
14) Remove the Gear-(14).
15) Remove the Gear-(15).

Before assembling these parts, remove the dust by using Air Blow.
Do not spread grease or oil to inside of this component.

6.2.14. Installation Position of the Lead Wires



Put the Lead wire between the rib.

It is made for core not to fall downward.

Wind 1 time to core.

Put the Charger Lead Wire under the Operation Lead Wire.

Wind 1 time to core.

Put the Charger Lead Wire under the Gear Chassis Lead Wire.

Operation Lead Wire

The position on Main Cabinet is incorrect.

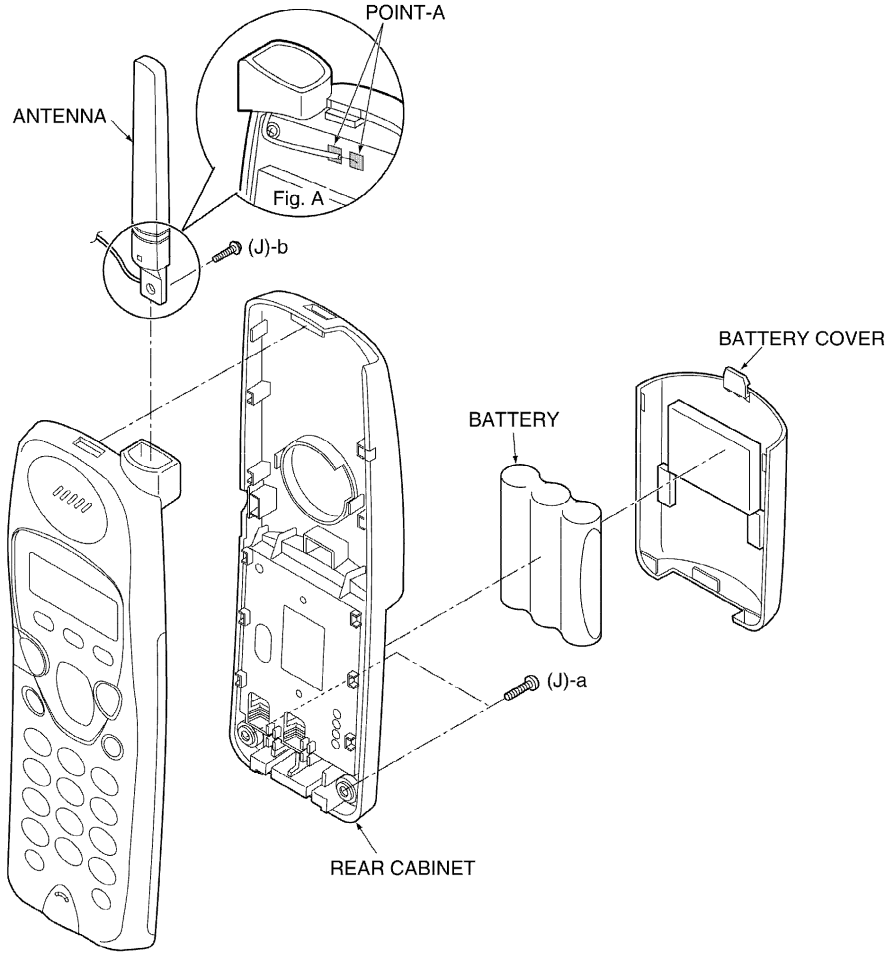
The position on the screw is incorrect.

6.2.15. How to Remove the Antenna of Handset

Procedure: C-1

REF No. C-1

1) Remove the BATTERY COVER.
2) Remove the BATTERY.
3) Remove the 2 screws (J)-a.
4) Remove the REAR CABINET.
5) Resolder the POINT-A. (Fig. A)
6) Remove the screw (J)-b.
7) Remove the ANTENNA.

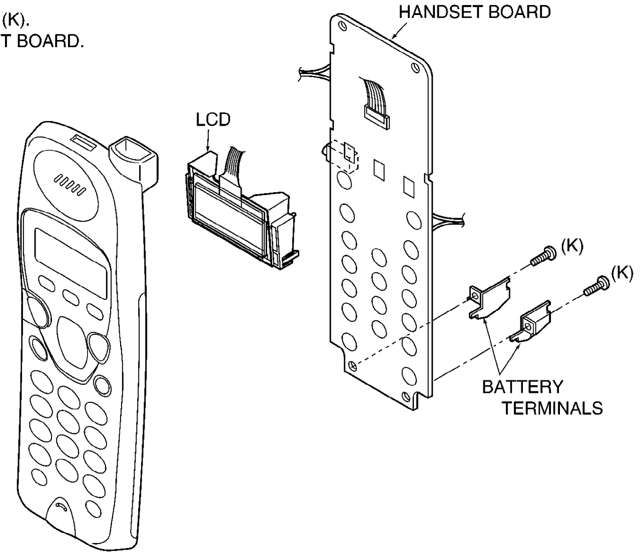

POINT-A
ANTENNA
Fig. A
(J)-b
BATTERY COVER
BATTERY
(J)-a
REAR CABINET

6.2.16. How to Remove the Handset Board and LCD

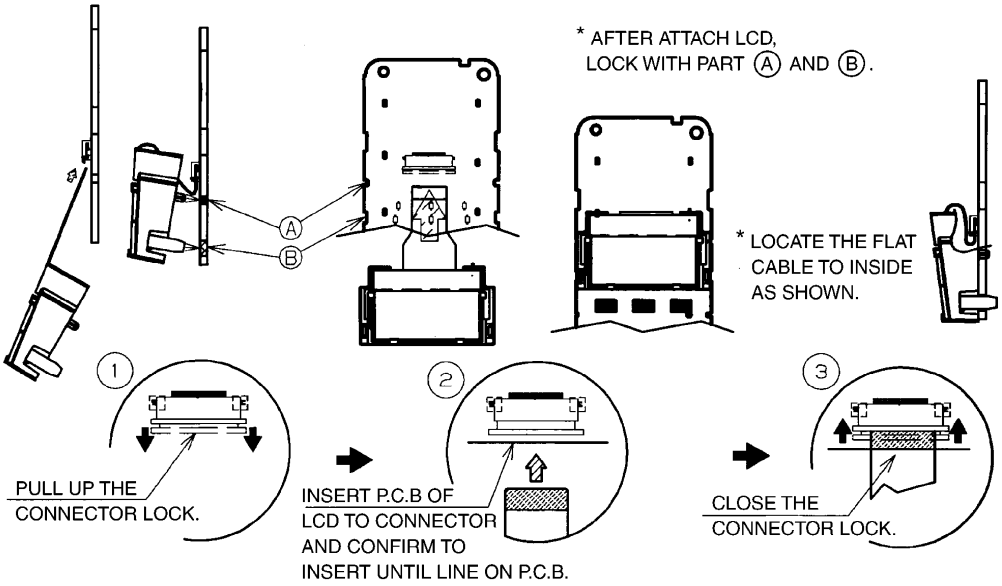
Procedure: C-1 --> C-2

REF No. C-2

1) Remove the 2 screws (K).
2) Remove the HANDSET BOARD.
3) Remove the LCD.


HANDSET BOARD
LCD
(K)
(K)
BATTERY
TERMINALS

6.2.16.1. Assembly the LCD to Handset Board


* AFTER ATTACH LCD,
LOCK WITH PART Ⓐ AND Ⓑ.
Ⓐ
Ⓑ
* LOCATE THE FLAT
CABLE TO INSIDE
AS SHOWN.
①
PULL UP THE
CONNECTOR LOCK.
②
INSERT P.C.B OF
LCD TO CONNECTOR
AND CONFIRM TO
INSERT UNTIL LINE ON P.C.B.
③
CLOSE THE
CONNECTOR LOCK.

7. TROUBLESHOOTING GUIDE

7.1. USER RECOVERABLE ERRORS

If the unit detects a problem, one or more of the following messages will appear on the display. The explanations given in the [ ] are for servicemen only.

7.1.1. Base Unit

```
CALL SERVICE
```

- There is something wrong with the unit.
  [This error is displayed when the thermal head does not warm up. Check the thermistor on the thermal head and connector lead.]

```
CHECK DOCUMENT
```

- The document was not fed into the unit properly. Re-insert the document. If misfeeding occurs frequently, clean the document feeder rollers and try again.
  (Refer to Document Feeder Cleaning ().)
- Attempted to transmit a document longer than 600 mm. Press [STOP] to remove the document. Divide the document into two or more sheets and try again.
  [Alternately, turn off service code #559 to enable sending of documents longer than 600 mm] (Refer to Service Function Table ().)

```
CHECK MEMORY
```

- The base unit memory (telephone numbers, parameters, etc.) has been erased. Re-program.

```
CHECK PAPER
```

- The unit has run out of paper. Install paper and press [START] to clear the message.
- The recording paper was not fed into the unit properly. (Refer to When the recording paper was not fed into the unit properly ().)
  Reinstall paper and press [START] to clear the message.
  (Refer to INSTALLING THE RECORDING PAPER ().)
- The recording paper has jammed near the recording paper entrance. Clear the jammed paper and press [START] to clear the message. (Refer to Recording Paper Jams ().)

COVER OPEN

↕

CHECK FILM

- The covers are open. Close them.
- The ink film is empty. Replace the ink film with a new one. (Refer to REPLACING THE INK FILM ().)
- The ink film is not installed Install it.
  (Refer to INSTALLING THE INK FILM ().)
- The ink film is slack or creased. Tighten it.
  (Refer to step 5 on INSTALLING THE INK FILM ().)

DIRECTORY FULL

- There is no space to store new items in navigator directory. Erase unnecessary items.

FAX IN MEMORY

- The unit has a document in memory. See the other displayed message instructions to print out the document.

FAX MEMORY FULL

- The memory is full of received documents due to a lack of recording paper or a recording paper jam. Install paper or clear the jammed paper. (Refer to INSTALLING THE RECORDING PAPER () and Recording Paper Jams ().)
- When performing memory transmission, the document being stored exceeded the memory capacity of the unit. Transmit the entire document manually.

FILM EMPTY

↕

COVER OPEN

- **The ink film is empty. Replace the ink film with a new one. (Refer to REPLACING THE INK FILM ().)**
- **The ink film is slack or creased. Tighten it (See step 5 on INSTALLING THE INK FILM ().) and install again.**
- **The fax machine is positioned near appliances such as TVs or speakers which generate an intense magnetic field.**

FILM NEAR EMPTY

- **The remaining film is low. Prepare a new film. (Refer to OPTIONAL ACCESSORIES ().)**

MEMORY FULL

- **When making a copy, the document being stored exceeded the memory capacity of the unit. Press [STOP] to clear the message. Divide the document into sections.**

MESSAGE FULL

- **There is no room left in memory to record a voice message. Erase unnecessary messages.**

MODEM ERROR

- **There is something wrong with the modem circuit.**

NO FAX REPLY

- The other party´s fax machine is busy or has run out of recording paper. Try again.

OPEN CABINET
CHECK FILM SLACK

↕

OPEN CABINET
CHECK FILM TYPE

- The ink film is slack or creased. Tighten it (See step 5 on INSTALLING THE INK FILM ()) and install again.
- The fax machine is positioned near appliances such as TVs or speakers which generate an intense magnetic field.

PAPER JAMMED

- A recording paper jam occurred. Clear the jammed paper. (Refer to Recording Paper Jams ().)

PLEASE WAIT

- The unit is checking that there is no slack on the ink film. Wait for a moment while the check completes.

REDIAL TIME OUT

- The other party´s fax machine is busy or has run out of recording paper. Try again.

REMOVE DOCUMENT

- The document is jammed. Remove the jammed document. (Refer to

Document Jams - sending ().)

```
TRANSMIT ERROR
```

- **A transmission error occurred. Try again.**
- **If you send a fax overseas, try the following:**
  —Use the overseas transmission mode (feature #23 on Program Mode Table ())
  —Add 2 pauses at the end of the telephone number or dial manually.

```
UNIT OVERHEATED
```

- **The unit is too hot. Let the unit cool down.**

7.1.2. Handset

```
Directory full
```

- **There is no space to store new items in the navigator directory. Erase unnecessary items.**

```
No link to base
Place on cradle
and try again.
```

- **The handset has lost communication with the base unit. Walk closer to the base unit, and try again.**
- **Place the handset on the base unit and try again.**
- **The power cord is disconnected. Plug in the power cord.**
- **Raise the base unit antenna.**

```
Not available
```

- **[▲], [▼], [FLASH], [CALL WAIT/PLAYBACK], [CLEAR], [HOLD] or**

[INTERCOM] was pressed while the base unit was in use.

```
Please lift up
and try again.
```

- **A button was pressed while the handset was on the base unit. Lift the handset and press the button again.**

```
   Save error
```

- **While programming, the handset lost communication with the base unit. Move closer to the base unit.**

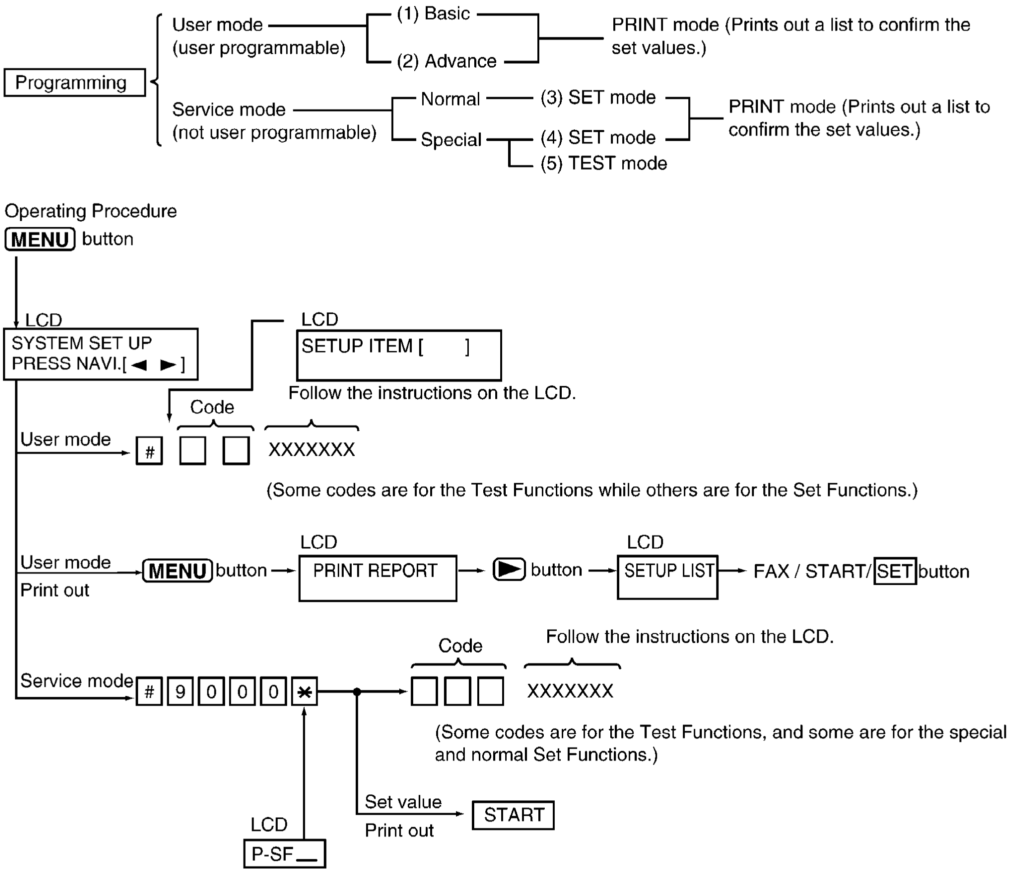
7.2. PROGRAMMING AND LISTS

The programming functions are used to program the various features and functions of the machine, and to test the machine.
This facilitates communication between the user and the service man while programming the unit.

7.2.1. Operation

There are 2 basic categories of programming functions, the User Mode and the Service Mode. The Service Mode is further broken down into the normal and special programs. The normal programs are those listed in the Operating Instructions and are available to the user. The special programs are only those listed here and not displayed to the user. In both the User and Service Modes, there are Set Functions and Test Functions. The Set Functions are used to program various features and functions, and the Test Functions are used to test the various functions. The Set Functions are accessed by entering their code, changing the appropriate value, then pressing the SET key. The Test Functions are accessed by entering their code and pressing the key listed on the menu. While programming, to cancel any entry, press the STOP key.

7.2.2. Operation Flow


Programming
User mode
(user programmable)
(1) Basic
(2) Advance
PRINT mode (Prints out a list to confirm the set values.)
Service mode
(not user programmable)
Normal
Special
(3) SET mode
(4) SET mode
(5) TEST mode
PRINT mode (Prints out a list to confirm the set values.)
Operating Procedure
MENU button
LCD
SYSTEM SET UP
PRESS NAVI.[◄ ►]
LCD
SETUP ITEM [ ]
Follow the instructions on the LCD.
Code
User mode
#
XXXXXXX
(Some codes are for the Test Functions while others are for the Set Functions.)
User mode
Print out
MENU button
LCD
PRINT REPORT
button
LCD
SETUP LIST
FAX / START/SET button
Code
Follow the instructions on the LCD.
Service mode
# 9 0 0 0 ✱
XXXXXXX
(Some codes are for the Test Functions, and some are for the special and normal Set Functions.)
Set value
Print out
START
LCD
P-SF

7.2.3. Service Function Table

Code	Function	Set Value	Effective Range	Default	Remarks
501	**Pause time set**	**X 100 msec**	**001~600**	**30**	**----------**
502	**Flash time**	**X 10 ms**	**01~99**	**70**	**----------**
503	**Dial speed select**	**1:10 pps 2: 20 pps**	**1, 2**	**1**	**----------**
510	**VOX time**	**1:6 sec 2: 4sec**	**1, 2**	**1**	**----------**
511	**VOX sense**	**1:High 2: Low**	**1, 2**	**1**	**When the TAM (or EXT TAM) d stop recording the ICM becaus detected on the telephone line, this setting to "LOW".**
514	**Bell detection time**	**X 100 msec**	**1~9**	**6**	**----------**
520	**CED frequency select**	**1:2100 Hz 2:1100 Hz**	**1, 2**	**1**	**See Symptom/Countermeasur long distance and international The unit can copy, but cannot transmit/receive long distance international communications**

Code	Function	Set Value	Effective Range	Default	Remarks
521	International mode select	1:ON 2: OFF	1, 2	1	See Symptom/Countermeasure long distance and international The unit can copy, but cannot transmit/receive long distance international communications (
522	Auto standby select	1:ON 2: OFF	1, 2	1	The resolution reverts to the de when transmission is complete
523	Receive equalizer select	1: 0 km 2: 1.8 km 3: 3.6 km 4: 7.2 km	1~4	1	When the telephone station is the unit or reception cannot be performed correctly, adjust acc
524	Transmission equalizer select	1: 0 km 2: 1.8 km 3: 3.6 km 4: 7.2 km	1~4	1	When the telephone station is the unit or transmission canno performed correctly, adjust acc
533	Setting the number of times that massage transfer is redialed.	00~99	00~99	03	Selects the number of times th message transfer is redialed (n including the first dialing).
534	Setting the massage transfer/pager call redial interval	001~999 sec	001~999	065	Sets the interval of message tr pager call redial.
550	Memory clear				See TEST FUNCTIONS().
551	ROM check				See TEST FUNCTIONS().
552	DTMF single tone test	1:ON 2: OFF	1, 2	2	See TEST FUNCTIONS().
553	Monitor on FAX communication select	1:OFF 2: PHASE B 3 :ALL	1~3	1	Sets whether to monitor the lin with the unit's speaker during communication or not.
554	Modem test				See TEST FUNCTIONS().
555	Scan check				See TEST FUNCTIONS().
556	Motor test			0	See TEST FUNCTIONS().
557	LED test				See TEST FUNCTIONS().
558	LCD test				See TEST FUNCTIONS().
559	Document jam detection select	1:ON 2: OFF	1, 2	1	See Document Jams - sending
561	KEY test				See TEST FUNCTIONS().
570	BREAK % select	1:61% 2: 67%	1, 2	1	Sets the % break of pulse dialin according PBX.
571	ITS auto redial time set	X number of times	00~99	0	Selects the number of times th redialed (not including the first
572	ITS auto redial line disconnection time set	X second	001~999	065	Sets the interval of ITS redialin

Code	Function	Set Value	Effective Range	Default	Remarks
573	Remote turn-on ring number set	X number of rings	01~99	10	Sets the number of rings befor starts to receive a document in mode.
580	TAM continuous tone detection	1:ON 2: OFF	1, 2	1	ON : Stops TAM operation whe tone, etc. are detected.
590	FAX auto redial time set	X number of times	00~99	2	Selects the number of redial ti during FAX communication (n including the first dial).
591	FAX auto redial time disconnection time set	X second	001~999	065	Sets the FAX redial interval du communication.
592	CNG transmit select	1:OFF / 2: ALL / 3: AUTO	1~3	2	Lets you select the CNG outpu FAX transmission. ALL: CNG i at phase A. AUTO: CNG id out when automatic dialing is perf OFF: CNG id not output at pha Refer to Sometime There is a T Problem().
593	Time between CED and 300bps	1:75 msec / 2:500 msec / 3:1 sec	1~3	1	See Symptom/Countermeasur long distance and internationa The unit can copy, but cannot transmit/receive long distance international communications to Receive Problem() and The copy, but cannot either transm long distance or international communications ().
594	Overseas DIS detection select	1:detects at the 1st time / 2: detects at the 2st time	1, 2	1	See Symptom/Countermeasur long distance and internationa The unit can copy, but cannot transmit/receive long distance international communications to Sometime There is a Transm Problem() and The unit can co cannot either transmit/receive distance or international communications ().
595	Receive error limit value set	X Number of times	001~999	100	Sets the number of acceptable lines when the FAX reconstruc received data. Refer to Receive ().
596	Transmit level set	X dBm	- 15~00	10	Selects the FAX transmission Refer to Sometime There is a T Problem ()and Receive Proble

Code	Function	Set Value	Effective Range	Default	Remarks
598	Receiving sensitivity	43= -43 dBm	20~48	40	Used when there is an error pr Refer to The unit can copy, but either transmit/receive long dis international communications(
717	Transmit speed selection	1: 14400BPS / 2: 12000BPS / 3: 9600BPS 4:7200BPS 5:4800BPS 6:2400BPS	1~6	1	Adjusts the speed to start train during FAX transmission. Refe Sometime There is a Transmit and The unit can copy, but the transmission and reception im incorrect().
718	Receive speed selection	1: 14400BPS / 2: 12000BPS / 3: 9600BPS 4:7200BPS 5:4800BPS 6:2400BPS	1~6	1	Adjusts the speed to start train during FAX reception. Refer to Problem() and The unit can co the transmission and receptio are incorrect ().
722	Redial tone detect	1:ON 2: OFF	1, 2	2	Sets the tone detection mode redialing.
731	CPC mode	1:A 2:B 3: OFF	1~3	1	Sets the CPC signal detection from the converter.
732	AUTO disconnect cancel time	1:350 ms 2 :1.8 sec 3: OFF	1~3	1	"Set to "2" when the auto disc circuit operates and cuts the li
745	Power ON film feed	1:ON 2: OFF	1, 2	1	When the power is turned on, wound to take up any slack.
763	CNG detect time for friendly reception	1:10 sec / 2 :20 sec / 3: 30 sec	1~3	3	Selects the CNG detection ton friendly reception.
771	T1 timer	1:35 sec / 2 :60 sec	1, 2	1	Sets a higher value when the r from the other party needs mo during FAX transmission.
774	T4 timer	X 100 msec	00~99	0	Use this function when delay o the line and communication (e comm) does not work well.

Code	Function	Set Value	Effective Range	Default	Remarks
775	Monitoring of message transfer	1:ON 2: OFF	1, 2	2	If set to ON a message can be from this unit´s SP-PHONE wh transferring a message.
784	Voice prompt test				You can hear the voice prompt speaker after pressing “START
815	Sensor & Vox check				See TEST FUNCTIONS().
841	Digital SP-phone check				See Digital Speakerphone().
844	Original setting	1:NORMAL 2:LIGHT 3:DARKER	1~3	1	Use this feature when you nee transmit and copy a document faint writing or very dark writin NORMAL: Used for normal wri LIGHT: Used for faint writing. DARKER: Used for dark writin
852	Print test pattern				See TEST FUNCTIONS ().
853	Top margin		1~9	5	----------
874	DTMF ON time	X msec	060~200	090	----------
875	DTMF OFF time	X msec	060~200	085	----------
880	History list				See History ().
881	Journal 2 list				See Printout Example ().
882	Journal 3 list				See Printout Example ().
958	Cordless test				See TEST FUNCTIONS ().

7.3. TEST FUNCTIONS

The codes listed below can be used to perform simple checks for some of the unit’s functions. When complaints are received from customers, they provide an effective tool for identifying the locations and causes of malfunctions. To do this, you set the Service mode (Refer to Operation Flow ().) first, then operate the below test items.

Test Mode	Type of Mode	Code Operation after code input	Function
MOTOR TEST	Service Mode	“5” “5” “6” START	Rotates the transmission and reception motor to operation of the motor. 13: FAX TX / Reading memory 14: Document feed 23: Recording paper is fed 33: List / FAX RX print, pull back recording paper 43: Copy 05: Recording paper feed (Test a recording paper feeding operation by shif 23 to 33). Press [STOP] button to quit.
MODEM TEST	Service Mode	“5” “5” “4” START	Telephone line circuit is connected automatically, the following signals on the circuit line. 1) OFF 2)14400bps 3)12000bps 4) 9600bps(U17) 5)7200bps(U17) 6)9600bps 7)7200bps 8) 4800bps 2400bps 10) 300bps 11) 2100Hz 12)1100Hz
FLASH MEMORY CHECK	Service Mode	“5” “5” “1” START	Indicates the version and checks the sum of the F MEMORY.
SCAN CHECK	Service Mode	“5” “5” “5” START	Turns on the LEDs of the CIS and operates the re systems.
LCD CHECK	Service Mode	“5” “5” “8” START	Checks the LCD indication. Illuminates all the dots to check if they are norma
DTMF SINGLE TEST	Service Mode	“5” “5” “2” 1....ON 2....OFF	Outputs the DTMF as single tones. Used to check frequencies of the individual DTMF tones. Refer t Single Tone Transmit Selection ().
LED CHECK	Service Mode	“5” “5” “7” START	All LEDs above the operation panel board flash o or are illuminated.
KEY CHECK	Service Mode	“5” “6” “1” START (any key)	Checks the button operation. Indicates the button code on the LCD while the bu pressed. Refer to Button Code Table ().
MEMORY CLEAR	Service Mode	“5” “5” “0” START	To reset the value to the default one, except the t (#853), time/day (#001), logo (#002), Fax No.(#003) and Directory data. Please restart a power supply after cleaning a me
PRINT TEST PATTERN	Service Mode	“8” “5” “2” START	Prints out the test pattern. Used mainly at the factory to test the print quality You can select 1~4. (See Print Test Pattern ())

Test Mode	Type of Mode	Code Operation after code input	Function
DIGITAL SPEAKERPHONE RX & TX CHECK	Service Mode	"8" "4" "1" SPEAKERPHONE	Please refer to Digital Speakerphone ()
SENSOR CHECK & VOX CHECK	Service Mode	"8" "1" "5" START	If you enter this mode and operate sensor levers hands, the LCD display of the related sensor (or turns ON / OFF. Also, when copying a document, related sensor will turn ON / OFF. (Do, Sn, Co, Pt For each sensor's operation, refer to SENSORS A SWITCHES(). [Do Sn Co Pt Vx] : LCD DISPLAY Do: Document set sensor :Paper inserted. Turns on when a document is ins Sn: Read position sensor. :At the read position, turns on when the front cov opened and the sensor lever is pressed directory. Co: Cover open sensor / Film end sensor :Cover open of don't set the film. Turns on and of front cover is opened and closed. Pt: Paper top sensor :Sensor on Turns on when the front cover is oper the sensor lever is pressed directly. Vx: Vox signal :Detection signal for the tone on the line. Turns o there is a tone signal on the line.
CORDLESS CHECK	Service Mode	"9" "5" "8" START	Please refer to Test Mode Flow Chart for Cordles Board ()

Note:

The numbers in the boxes (XXX) indicate the keys to be input for the various test modes.

7.3.1. DTMF Single Tone Transmit Selection

When set to ON (=1), the 12 keys and transmission frequencies are as shown.

key	High Frequency (Hz)	key	Low Frequency (Hz)
“1”	697	“5”	1209
“2”	770	“6”	1336
“3”	852	“7”	1477
“4”	941	“8”	1633

When set to OFF (=2), the 12 keys and transmission frequencies are as shown.

High (Hz) Low (Hz)	1209	1336	1477
697	“1”	“2”	“3”
770	“4”	“5”	“6”
852	“7”	“8”	“9”
941	“✳”	“0”	“#”

Note:

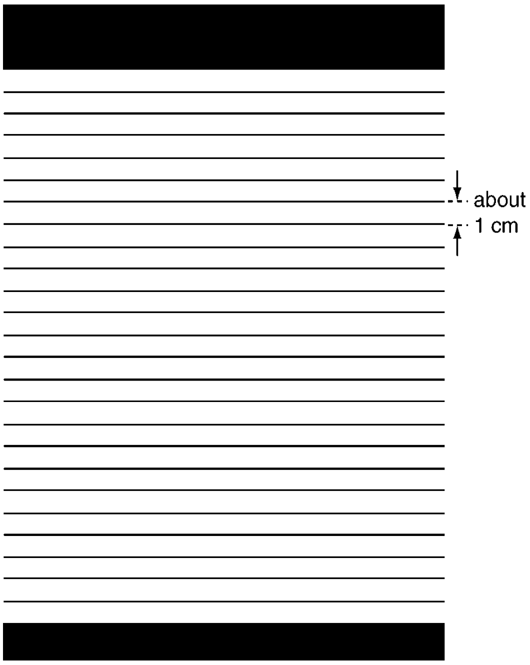
After performing this check, do not forget to turn the setting off. Otherwise, dialing in DTMF signal will not work.

7.3.2. Button Code Table

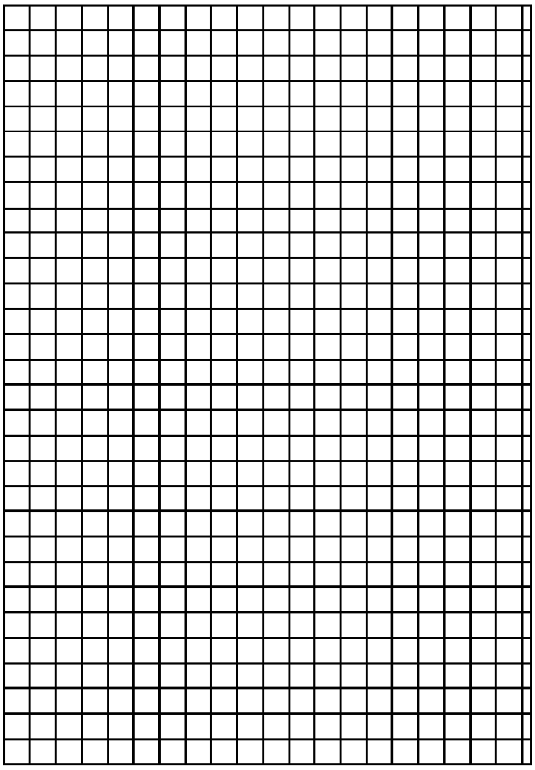
Code	Button Name	Code	Button Name	Code	Button Name
04	FAX /START / SET	25	[+] VOLUME	3A	0
06	COPY	26	[—] VOLUME	3B	✳
08	SP-PHONE	31	1	3C	#
09	LOCATOR	32	2	3D	REDIAL / PAUSE
0A	MUTE	33	3	3E	FLASH
0C	AUTO ANSWER	34	4	47	CALLER ID
14	RECORD	35	5	4E	CALLER IQ
16	ERASE	36	6	1E	[▶] NEXT
18	PLAY MESSAGE	37	7	1F	[◀]PREV
20	MENU	38	8	00	NO INPUT
22	HELP	39	9	01	STOP

7.3.3. Print Test Pattern

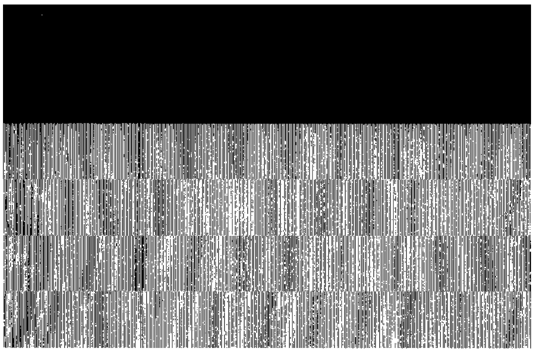
1. Platen roller



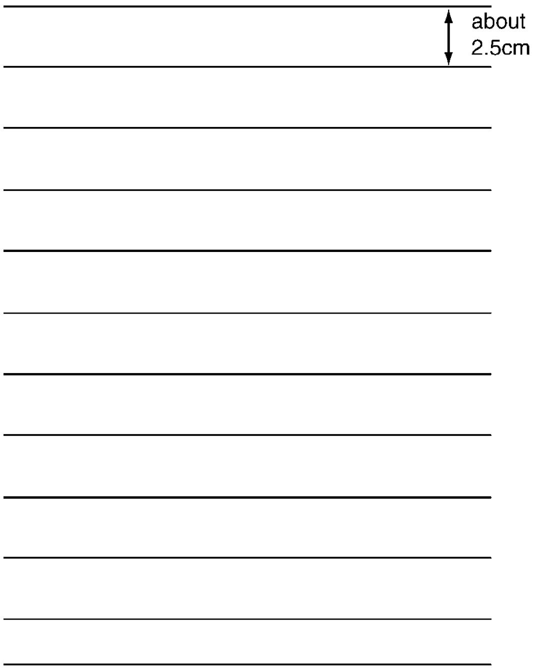
2. Left margin / Top margin



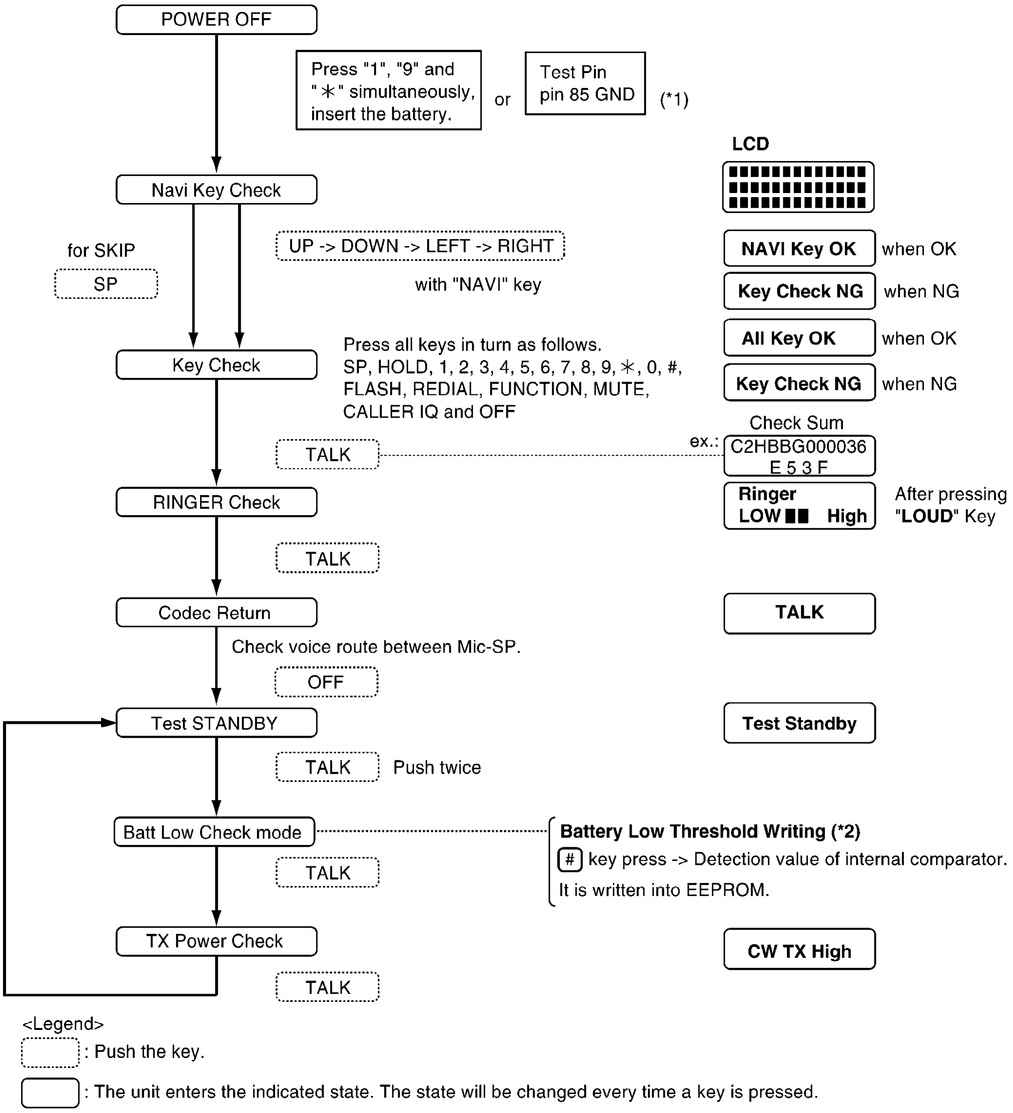
3. Thermal head 1 dot



4. Use this test pattern to confirm the torque limiter for Ink film and platen roller timing.



7.3.4. Test Mode Flow Chart for Handset


POWER OFF
Press "1", "9" and "✳" simultaneously, insert the battery.
or
Test Pin
pin 85 GND
(*1)
LCD
Navi Key Check
for SKIP
SP
UP -> DOWN -> LEFT -> RIGHT
with "NAVI" key
NAVI Key OK
when OK
Key Check NG
when NG
Key Check
Press all keys in turn as follows.
SP, HOLD, 1, 2, 3, 4, 5, 6, 7, 8, 9, ✳, 0, #,
FLASH, REDIAL, FUNCTION, MUTE,
CALLER IQ and OFF
All Key OK
when OK
Key Check NG
when NG
Check Sum
ex.:
C2HBBG000036
E 5 3 F
TALK
RINGER Check
Ringer
LOW ▮▮ High
After pressing
"LOUD" Key
TALK
Codec Return
TALK
Check voice route between Mic-SP.
OFF
Test STANDBY
Test Standby
TALK
Push twice
Batt Low Check mode
Battery Low Threshold Writing (*2)
# key press -> Detection value of internal comparator.
It is written into EEPROM.
TALK
TX Power Check
CW TX High
TALK
<Legend>
: Push the key.
: The unit enters the indicated state. The state will be changed every time a key is pressed.

(*1) See Handset Reference Drawing () ------ Should return to OPEN after entering the Test mode.
(*2) See ADJUSTMENT BATTERY LOW DETECTOR VOLTAGE ().

7.3.4.1. X201 Check

The confirmation is made under the “TX Power Check” mode of TEST MODE.
Equipment: Frequency counter
TP for measurement: TP_ANT
Measure range: 2472.64550 MHz ± 5 kHz (1ch) at Test Standby mode in Test Mode Flow Chart for Cordless Base Board ().

7.3.5. Test Mode Flow Chart for Cordless Base Board

1. Press the [MENU] [#] [9] [0] [0] [0] [✳] [9] [5] [8] keys.
LCD display:

```
CORDLESS TEST
```

2. Press the [SET] key and select test items by pressing [▼] key.
LCD display:

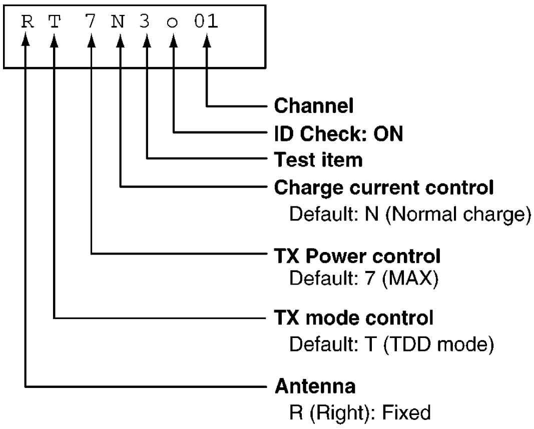
1. Normal Mode
2. RCV Mode
3. SND Mode
4. Talk Mode

3. Press the [SET] key and select the channel by [0]~[9] key input.
LCD display:

```
Channel=01
```

4. Press the [SET] key to start test.

ex.) In case of “3. Send Data Mode”


R T 7 N 3 o 01
Channel
ID Check: ON
Test item
Charge current control
Default: N (Normal charge)
TX Power control
Default: 7 (MAX)
TX mode control
Default: T (TDD mode)
Antenna
R (Right): Fixed

Note:

- In case of measurement except test mode: Turn the Power OFF/ON
- Channel setting (Transmitting-Receiving Frequency) of this cordless check need to change on account of Environment.

7.3.6. Frequency Table

Channel	TX/RX Frequency (MHz)	Channel	TX/RX Frequency (MHz)
1	2472.70400	21	2405.63050
2	2473.21425	22	2406.14400
3	2474.75150	23	2406.65425
4	2475.26175	24	2407.16775
5	2475.77525	25	2407.67800
6	2476.28550	26	2409.21525
7	2476.80225	27	2429.18325
8	2477.31250	28	2429.69675
9	2477.82600	29	2430.20700
10	2478.33625	30	2430.72050
11	2478.84975	31	2431.23075
12	2479.36000	32	2431.74425
13	2479.87350	33	2432.25450
14	2402.04900	34	2433.79175
15	2402.55925	35	2434.30200
16	2403.07275	36	2434.81550
17	2403.58300	37	2435.32575
18	2404.09650	38	2435.83925
19	2404.60675	39	2436.34950
20	2405.12025		

7.3.7. Handset Reference Drawing

When connecting the Simulator and Equipments for checking, please refer to below.

7.3.8. Cordless Base Board Reference Drawing

When connecting the Simulator and Equipments for checking, please refer to below.

7.4. REMOTE PROGRAMMING

If, after the call is connected, the customer describes the situation and it is determined that the problem can be corrected by making parameter changes, this function makes it possible to change parameters such as the user code and service code from another fax (using DTMF tones). Therefore, travel to the customer's location is not required. However, it is not possible to change all the parameters remotely (Program Mode Table ()). The function used to accomplish this is remote programming.

First, in order to check the current status of the service code parameter, print out the setup list (code: 991) and the service list (code: 999) from the customer's fax machine.

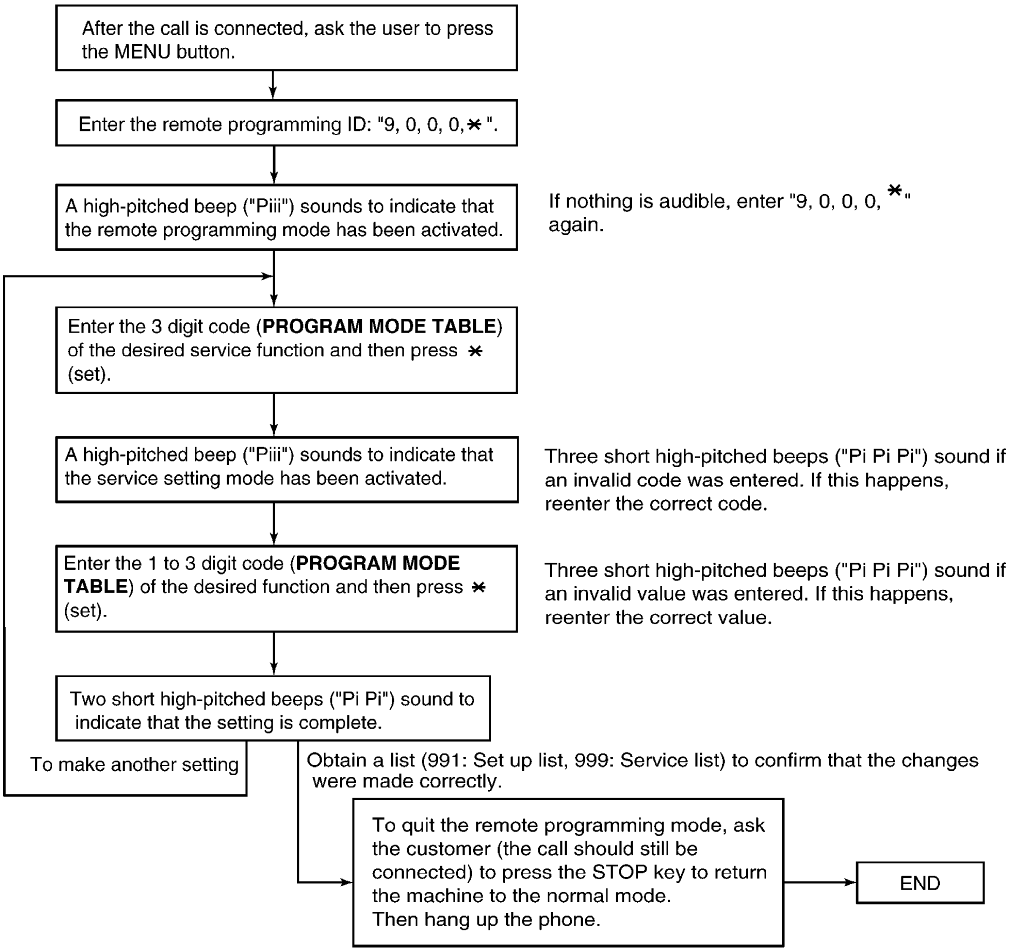
Based on this, the parameters for the desired codes can be changed.

The procedure for changing and listing parameters is described on Entering the Remote Programming Mode and Changing Service Codes (). Also, before exiting the remote programming mode, it is advisable to obtain a new list to confirm that the changes were made correctly.

Hint:

Since the connected telephone is in use during the remote programming mode, it may be helpful to ask the customer to switch to the speakerphone. This frees the customer from the need to remain right next to the fax while you are making parameter settings. When finished, inform the customer. Also note that in very noisy locations where the DTMF tones are not audible, the remote programming function will not work.

7.4.1. Entering the Remote Programming Mode and Changing Service Codes



After the call is connected, ask the user to press the MENU button.

Enter the remote programming ID: "9, 0, 0, 0, *".

A high-pitched beep ("Piii") sounds to indicate that the remote programming mode has been activated.

If nothing is audible, enter "9, 0, 0, 0, *" again.

Enter the 3 digit code (**PROGRAM MODE TABLE**) of the desired service function and then press * (set).

A high-pitched beep ("Piii") sounds to indicate that the service setting mode has been activated.

Three short high-pitched beeps ("Pi Pi Pi") sound if an invalid code was entered. If this happens, reenter the correct code.

Enter the 1 to 3 digit code (**PROGRAM MODE TABLE**) of the desired function and then press * (set).

Three short high-pitched beeps ("Pi Pi Pi") sound if an invalid value was entered. If this happens, reenter the correct value.

Two short high-pitched beeps ("Pi Pi") sound to indicate that the setting is complete.

To make another setting

Obtain a list (991: Set up list, 999: Service list) to confirm that the changes were made correctly.

To quit the remote programming mode, ask the customer (the call should still be connected) to press the STOP key to return the machine to the normal mode. Then hang up the phone.

CROSS REFERENCE:

Program Mode Table ()

7.4.2. Program Mode Table

Code	Function	Set Value	Default	Remo Setti
001	Set date and time	mm/dd/yy hh:mm	Jan/01/2003	NG
002	Your logo	---------	None	NG
003	Your FAX number	---------	None	NG
004	Print sending mode	1:ERROR / 2:ON / 3:OFF	ERROR	OK
006	FAX ring count	1~4	3	OK
	TAM/FAX ring count	1~4 / 5:TOLL SAVER / 6: RINGER OFF	2	OK
010	Recording time	1:VOX / 2: 1MIN	VOX	OK
011	Remote TAM ID	---------	ID=111	NG
013	Dialing mode	1:TONE / 2:PULSE	TONE	OK
016	Paper Size	1:A4 / 2:LETTER	LETTER	OK
017	Ringer pattern	A / B / C	A	NG
022	Journal auto print	1:ON / 2:OFF	ON	OK
023	Overseas mode	1:NEXT FAX / 2:ERROR / 3: OFF	ERROR	OK
025	Delayed transmission	ON / OFF	OFF	NG
026	Auto caller ID list	1:ON / 2:OFF	OFF	OK
031	Distinctive ring	1:ON / 2:OFF	OFF	OK
032	Fax ring pattern	1:B-D / 2:A / 3:B / 4:C / 5:D	B-D	OK
034	Quick scan	1:ON / 2:OFF	OFF	OK
036	RCV reduction	1:72% / 2:86% / 3:92% / 4: 100%	92%	OK
039	LCD contrast	NORMAL / DARKER	NORMAL	NG
041	FAX activation code	ON / OFF	ON ID=*#9	NG
042	Message alert	1:ON / 2:OFF	OFF	OK
043	REC. time alert	1:ON / 2:OFF	OFF	OK
044	Memory receive alert	1:ON / 2:OFF	ON	OK
046	Friendly reception	1:ON / 2:OFF	ON	OK
047	FAX voice guidance	1:ERROR/2:ON/3:OFF	ON	OK
051	Mailbox 1 Password	---------	---------	NG
052	Mailbox 2 Password	---------	---------	NG
054	Greeting MSG. REC. time	1:16s / 2:60s	16s	OK
055	Mailbox 1 Greeting	CHECK / RECORD / ERASE	CHECK	NG
056	Mailbox 2 Greeting	CHECK / RECORD / ERASE	CHECK	NG
060	Message transfer	ON / OFF	OFF	NG
061	Transfer greeting	CHECK / RECORD / ERASE	CHECK	NG
067	ICM monitor	1:ON / 2:OFF	ON	OK
070	Pager call	ON / OFF	OFF	NG
076	Connecting tone	1:ON / 2:OFF	ON	OK
077	Auto answer mode	1:TAM/FAX 2: FAX Only	TAM/FAX	OK
080	Set default	YES / NO	NO	NG
501	Pause time set	001~600 x 100msec	030 x 100msec	OK
502	Flash time set	01~99 x 10msec	70 x 10msec	OK

Code	Function	Set Value	Default	Remo Setti
503	Dial speed	1:10pps / 2:20 pps	10pps	OK
510	Vox time	1:6sec / 2:4sec	6sec	OK
511	Vox sense	1:High / 2:Low	High	OK
514	Bell detection time	1~9 × 100msec	6 × 100msec	OK
520	CED frequency select	1:2100Hz / 2:1100Hz	2100Hz	OK
521	International mode select	1:ON / 2:OFF	ON	OK
522	Auto standby select	1:ON / 2:OFF	ON	OK
523	Receive equalizer select	1:0km / 2:1.8km / 3:3.6km / 4: 7.2km	0km	OK
524	Transmission equalizer select	1:0km / 2:1.8km / 3:3.6km / 4: 7.2km	0km	OK
533	Setting the number of times that message transfer is redialed.	00~99	03	OK
534	Setting of the message transfer/ pager call redial interval	001~999	065	OK
550	Memory clear	---------	---------	NG
551	ROM check	---------	---------	NG
552	DTMF signal tone test	1:ON / 2:OFF	OFF	OK
553	Monitor on FAX communication	1:OFF / 2:Phase B / 3:ALL	OFF	OK
554	Modem test	---------	---------	NG
555	Scanner test	---------	---------	NG
556	Motor test	---------	---------	NG
557	LED test	---------	---------	NG
558	LCD test	---------	---------	NG
559	Document jam detection	1:ON / 2:OFF	ON	OK
561	Key test	---------	---------	NG
570	Break % select	1:61% / 2:67%	61%	OK
571	ITS auto redial time set	00~99	00	OK
572	ITS auto redial line disconnection time set	001~999sec	065sec	OK
573	Remote turn-on ring number	01~99	10	OK
580	TAM continuous tone detection	1:ON / 2:OFF	ON	OK
590	FAX auto redial time set	00~99	02	OK
591	FAX auto redial line disconnection time set	001~999sec	065sec	OK
592	CNG transmit select	1:OFF / 2:ALL / 3:AUTO	ALL	OK
593	Time between CED and 300 bps	1:75ms / 2:500ms / 3:1sec	75ms	OK
594	Overseas DIS detection	1:1st / 2:2nd	1st	OK
595	Receive error limit value	001~999	100	OK
596	Transmit level set	-15~00dBm	-10dBm	OK
598	Receiving Sensitivity	20~48	40	OK
717	Transmit speed select	1:14400 / 2:12000 / 3:9600/ 4: 7200/ 5:4800/ 6:2400	14400bps	OK
718	Receive speed select	1:14400 / 2:12000 / 3:9600/ 4: 7200/ 5:4800/ 6:2400	14400bps	OK

Code	Function	Set Value	Default	Remo Setti
722	Redial tone detect	1:ON / 2:OFF	OFF	OK
731	CPC mode	1:A / 2:B / 3:OFF	A	OK
732	Auto disconnect	1:350ms / 2:1800ms / 3:OFF	350msec	OK
745	Power on film feed	1:ON / 2:OFF	ON	OK
763	CNG detect time for friendly reception	1:10s / 2:20s / 3:30s	30s	OK
771	T1 timer	1:35s / 2:60s	35s	OK
774	T4 timer	00~99 x 100ms	00ms	OK
775	Monitoring of message transfer	1:ON / 2:OFF	OFF	OK
784	Voice prompt	1:Start	---------	NG
815	Sensor & VOX test	---------	---------	NG
841	Digital SP-Phone RX & TX check	1:SP-Phone	---------	NG
844	Original setting	1:Normal / 2:Light / 3:Darker	Normal	NG
852	Print test pattern	---------	---------	NG
853	Top margin	1~9	5	OK
874	DTMF ON time	060~200 × msec	090 ms	OK
875	DTMF OFF time	060~200 × msec	085 ms	OK
880	History list	1:Start	---------	NG
881	Journal 2	1:Start	---------	NG
882	Journal 3	1:Start	---------	NG
958	Cordless test mode	---------	---------	NG
991	Setup list	1:Start	---------	OK
994	Journal list	1:Start	---------	OK
995	Journal 2 list	1:Start	---------	OK
996	Journal 3 list	1:Start	---------	OK
998	History list	1:Start	---------	OK
999	Service list	1:Start	---------	OK

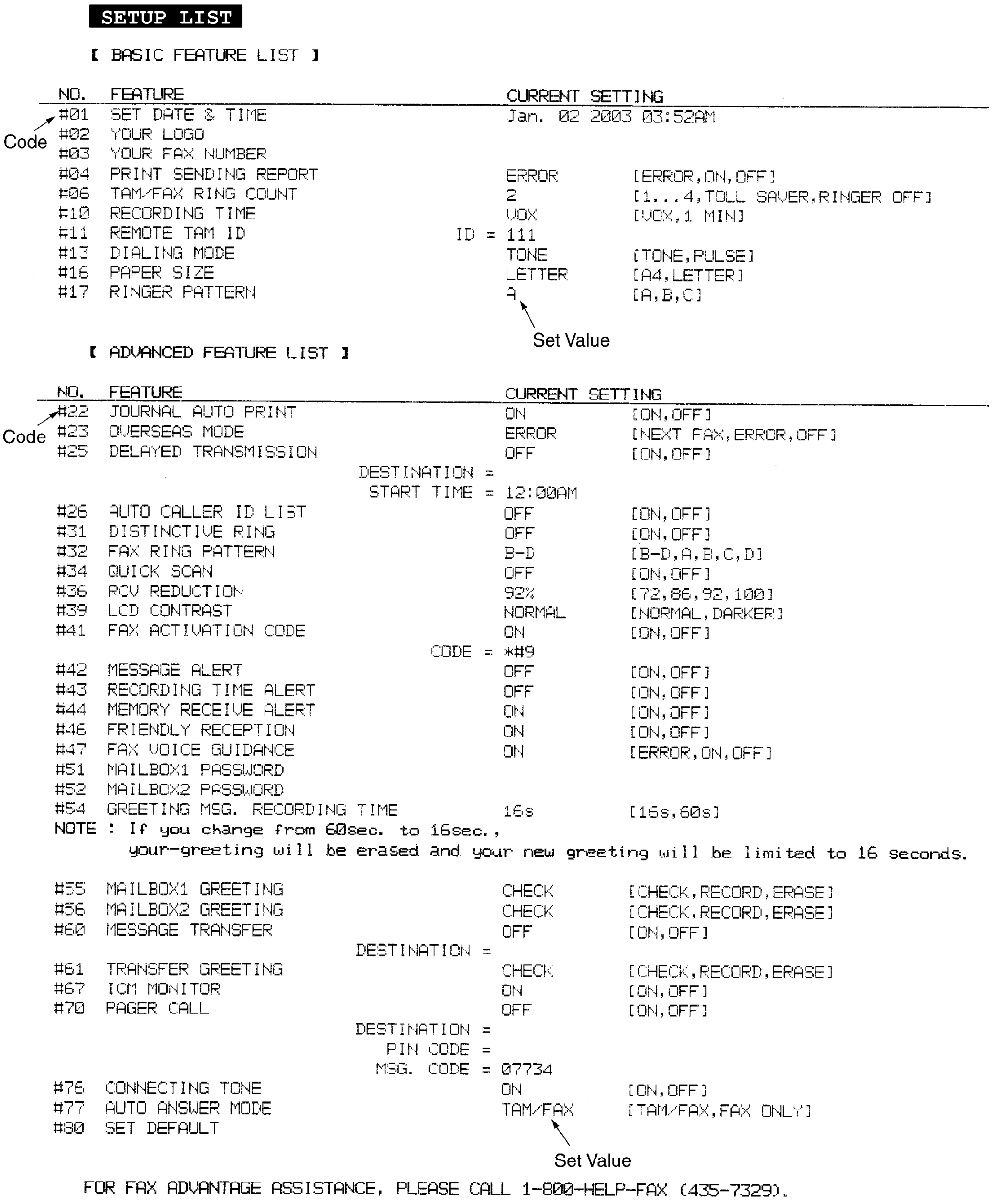
OK means "can set".
NG means "can not set".

Note:
Refer to Service Function Table () for descriptions of the individual codes.

Example:
If you want to set value in the "004 Transmission report mode", press the dial key number 1,2 or 3 corresponding to the Set Value you want to select. (1:ERROR/2:ON/3:OFF)

7.5. THE EXAMPLE OF THE PRINTED LIST

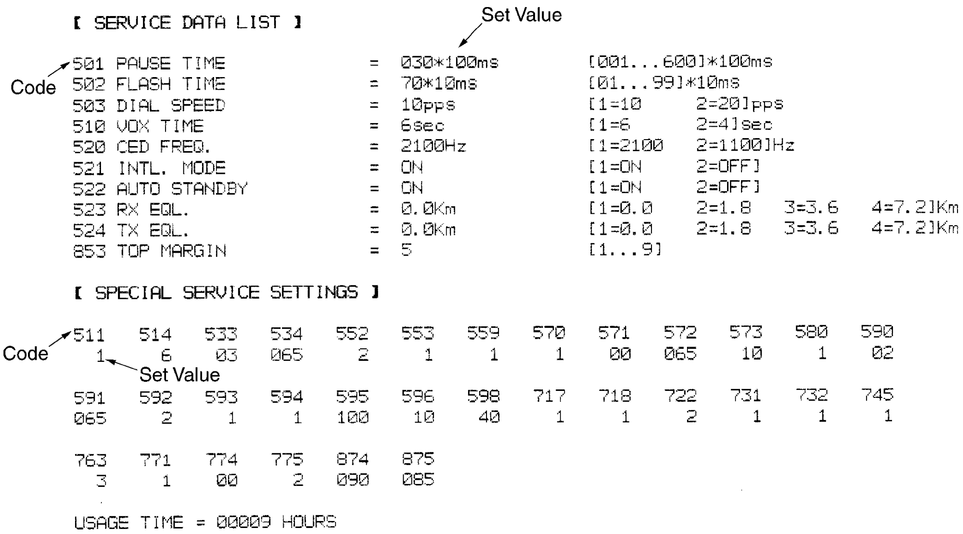
7.5.1. User Mode


Code
Set Value
Code
Set Value

```
SETUP LIST

[ BASIC FEATURE LIST ]

 NO.  FEATURE                                        CURRENT SETTING
 #01  SET DATE & TIME                                Jan. 02 2003 03:52AM
 #02  YOUR LOGO
 #03  YOUR FAX NUMBER
 #04  PRINT SENDING REPORT                           ERROR       [ERROR,ON,OFF]
 #06  TAM/FAX RING COUNT                             2           [1...4,TOLL SAVER,RINGER OFF]
 #10  RECORDING TIME                                 VOX         [VOX,1 MIN]
 #11  REMOTE TAM ID                             ID = 111
 #13  DIALING MODE                                   TONE        [TONE,PULSE]
 #16  PAPER SIZE                                     LETTER      [A4,LETTER]
 #17  RINGER PATTERN                                 A           [A,B,C]

[ ADVANCED FEATURE LIST ]

 NO.  FEATURE                                        CURRENT SETTING
 #22  JOURNAL AUTO PRINT                             ON          [ON,OFF]
 #23  OVERSEAS MODE                                  ERROR       [NEXT FAX,ERROR,OFF]
 #25  DELAYED TRANSMISSION                           OFF         [ON,OFF]
                                       DESTINATION =
                                        START TIME = 12:00AM
 #26  AUTO CALLER ID LIST                            OFF         [ON,OFF]
 #31  DISTINCTIVE RING                               OFF         [ON,OFF]
 #32  FAX RING PATTERN                               B-D         [B-D,A,B,C,D]
 #34  QUICK SCAN                                     OFF         [ON,OFF]
 #36  RCV REDUCTION                                  92%         [72,86,92,100]
 #39  LCD CONTRAST                                   NORMAL      [NORMAL,DARKER]
 #41  FAX ACTIVATION CODE                            ON          [ON,OFF]
                                              CODE = *#9
 #42  MESSAGE ALERT                                  OFF         [ON,OFF]
 #43  RECORDING TIME ALERT                           OFF         [ON,OFF]
 #44  MEMORY RECEIVE ALERT                           ON          [ON,OFF]
 #46  FRIENDLY RECEPTION                             ON          [ON,OFF]
 #47  FAX VOICE GUIDANCE                             ON          [ERROR,ON,OFF]
 #51  MAILBOX1 PASSWORD
 #52  MAILBOX2 PASSWORD
 #54  GREETING MSG. RECORDING TIME                   16s         [16s,60s]
 NOTE : If you change from 60sec. to 16sec.,
        your-greeting will be erased and your new greeting will be limited to 16 seconds.

 #55  MAILBOX1 GREETING                              CHECK       [CHECK,RECORD,ERASE]
 #56  MAILBOX2 GREETING                              CHECK       [CHECK,RECORD,ERASE]
 #60  MESSAGE TRANSFER                               OFF         [ON,OFF]
                                       DESTINATION =
 #61  TRANSFER GREETING                              CHECK       [CHECK,RECORD,ERASE]
 #67  ICM MONITOR                                    ON          [ON,OFF]
 #70  PAGER CALL                                     OFF         [ON,OFF]
                                       DESTINATION =
                                          PIN CODE =
                                         MSG. CODE = 07734
 #76  CONNECTING TONE                                ON          [ON,OFF]
 #77  AUTO ANSWER MODE                               TAM/FAX     [TAM/FAX,FAX ONLY]
 #80  SET DEFAULT

 FOR FAX ADVANTAGE ASSISTANCE, PLEASE CALL 1-800-HELP-FAX (435-7329).
```

Note:
The above values are the default values.

7.5.2. Service Mode Settings

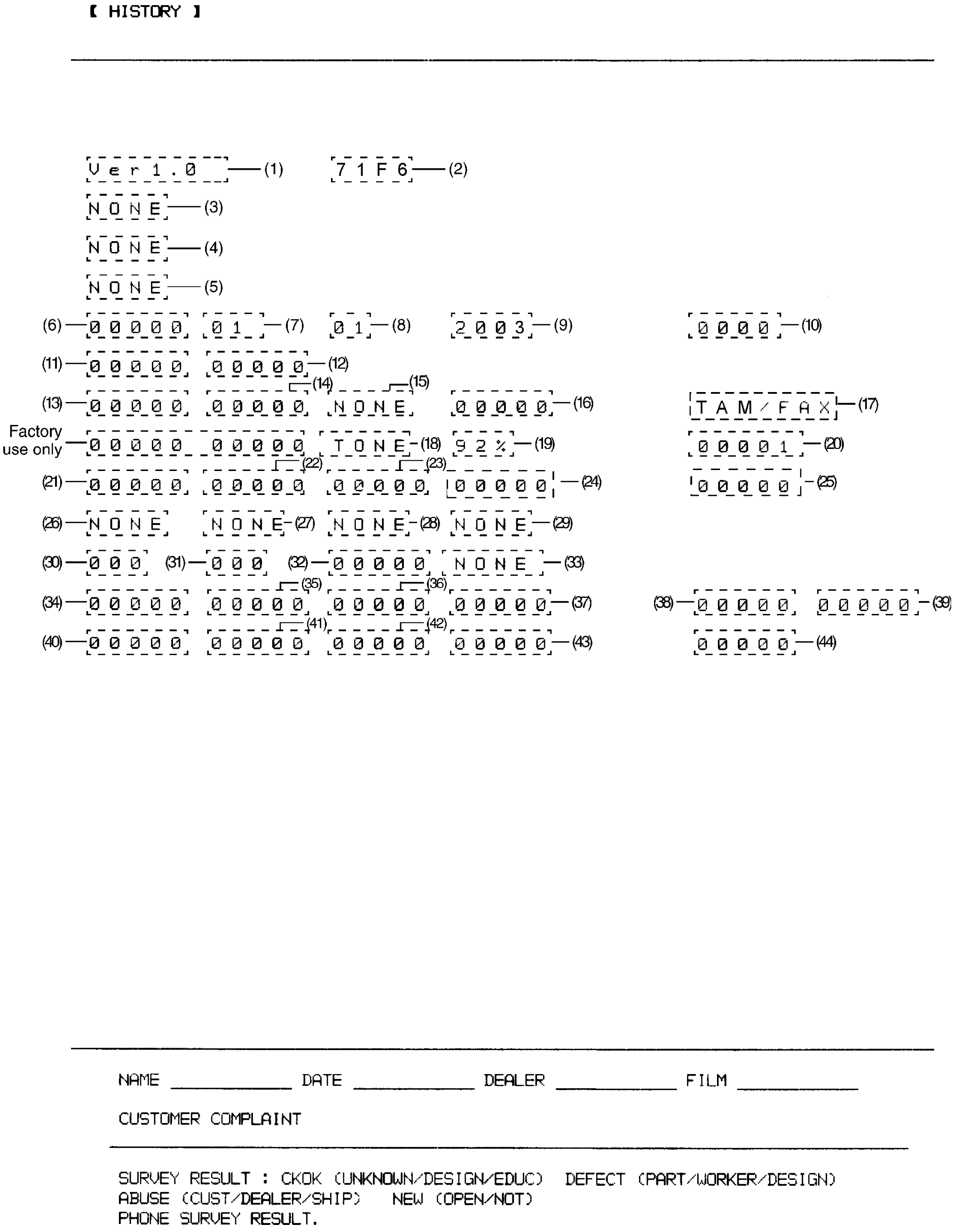


Set Value
Code
Code
Set Value

```
[ SERVICE DATA LIST ]

501 PAUSE TIME              =  030*100ms      [001...600]*100ms
502 FLASH TIME              =  70*10ms        [01...99]*10ms
503 DIAL SPEED              =  10pps          [1=10      2=20]pps
510 VOX TIME                =  6sec           [1=6       2=4]sec
520 CED FREQ.               =  2100Hz         [1=2100    2=1100]Hz
521 INTL. MODE              =  ON             [1=ON      2=OFF]
522 AUTO STANDBY            =  ON             [1=ON      2=OFF]
523 RX EQL.                 =  0.0Km          [1=0.0     2=1.8    3=3.6    4=7.2]Km
524 TX EQL.                 =  0.0Km          [1=0.0     2=1.8    3=3.6    4=7.2]Km
853 TOP MARGIN              =  5              [1...9]

[ SPECIAL SERVICE SETTINGS ]

511    514    533    534    552    553    559    570    571    572    573    580    590
  1      6     03    065      2      1      1      1     00    065     10      1     02

591    592    593    594    595    596    598    717    718    722    731    732    745
065      2      1      1    100     10     40      1      1      2      1      1      1

763    771    774    775    874    875
  3      1     00      2    090    085

USAGE TIME = 00009 HOURS
```

Note:
The above values are the default values.

7.5.3. History



```
[ HISTORY ]

Ver1.0 —(1)      71F6 —(2)
NONE —(3)
NONE —(4)
NONE —(5)
(6)—00000  01 —(7)  01 —(8)  2003 —(9)          0000 —(10)
(11)—00000  00000 —(12)
(13)—00000  00000 (14) NONE (15)  00000 —(16)   TAM/FAX —(17)
Factory use only —00000  00000  TONE —(18)  92% —(19)   00001 —(20)
(21)—00000  00000 (22) 00000 (23) 00000 —(24)   00000 —(25)
(26)—NONE  NONE —(27)  NONE —(28)  NONE —(29)
(30)—000  (31)—000  (32)—00000  NONE —(33)
(34)—00000  00000 (35) 00000 (36) 00000 —(37)   (38)—00000  00000 —(39)
(40)—00000  00000 (41) 00000 (42) 00000 —(43)   00000 —(44)

NAME ____________ DATE ____________ DEALER ____________ FILM ____________

CUSTOMER COMPLAINT

SURVEY RESULT : CKOK (UNKNOWN/DESIGN/EDUC)  DEFECT (PART/WORKER/DESIGN)
ABUSE (CUST/DEALER/SHIP)   NEW (OPEN/NOT)
PHONE SURVEY RESULT.
```

Note:

See the following descriptions of this report. Item No. (1) ~ (44) are corresponding to the listed items in Descriptions of the History Report().

7.5.3.1. Descriptions of the History Report

(1) SOFTWARE VERSION

FLASH ROM version

(2) SUM

FLASH ROM internal data calculation.

(3) YOUR LOGO

The user logo recorded in the unit. If it is not recorded, NONE will be displayed.

(4) YOUR TELEPHONE NUMBER

The user telephone number recorded in the unit. If it is not recorded, NONE will be displayed.

(5) FAX PAGER NUMBER

If you program a pager number into the unit, the pager number will be displayed here.

(6) FACTORY - CUSTOMER

This shows how many days from factory production until the user turns ON the unit.

(7) MONTH

The shows the very first month, date, year and time set by the user after they purchased the unit.

(8) DAY

The shows the very first month, date, year and time set by the user after they purchased the unit.

(9) YEAR

The shows the very first month, date, year and time set by the user after they purchased the unit.

(10) TIME

The shows the very first month, date, year and time set by the user after they purchased the unit.

(11) USAGE TIME

The amount of time the unit has been powered ON.

(12) FACTORY - NOW

This shows how many days from factory production until the user prints out this history list.

(13) TEL MODE

The amount of time the TEL mode setting was used.

(14) FAX MODE

The amount of time the FAX mode setting was used.

(15) Not used

(16) TAM/FAX MODE

The amount of time the ANS/FAX mode setting was used.

(17) FINAL RECEIVE MODE

The last set receiving mode by the user.

(18) TONE/PULSE SELECTION

The most recently used setting used, either TONE or PULSE.

(19) RECEIVE REDUCTION

The compression rate when receiving.

(20) SETTING NO. OF DIRECTORY

The recorded directory stations.

(21) NUMBER OF COPY

The number of pages copied.

(22) NUMBER OF RECEIVE

The number of pages received.

(23) NUMBER OF SENDING

The number of pages sent.

(24) NUMBER OF CALLER ID

The number of times Caller ID was received.

(25) NUMBER OF RECORDING MESSAGE

The number of messages recorded in TAM.

(26)~(29) Not Used

(30) NUMBER OF PRINTING WARNING LIST

The number of warning lists printed until now.

(31) NUMBER OF PRINTING HELP

The number of help lists printed until now.

(32) NUMBER OF DIVIDED PRINTING IN FAX RECEPTION

The number of faxes received that were divided into more than one sheet since the unit was purchased.
(33) Not used
(34) FAX MODE
Means the unit received a fax message in the FAX mode.
(35) MAN RCV
Means the unit received a fax message by manual operation.
(36) FRN RCV
Means the unit received a fax message by friendly signal detection.
(37) VOX
Means the unit detected silence or no voice.
(38) RMT DTMF
Means the unit detected DTMF (Remote Fax activation code) entered remotely.
(39) PAL DTMF
Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
(40) TURN-ON
Means the unit started to receive after 10 rings. (Remote Turn On: Service Code #573)
(41) Not used
(42) IDENT
Means the unit detected Ring Detection.
(43) CNG OGM
Means the unit detected the CNG while it was sending the OGM in the TAM/FAX mode.
(44) CNG ICM
Means the unit detected the CNG while it was recording the ICM in the TAM/FAX mode.

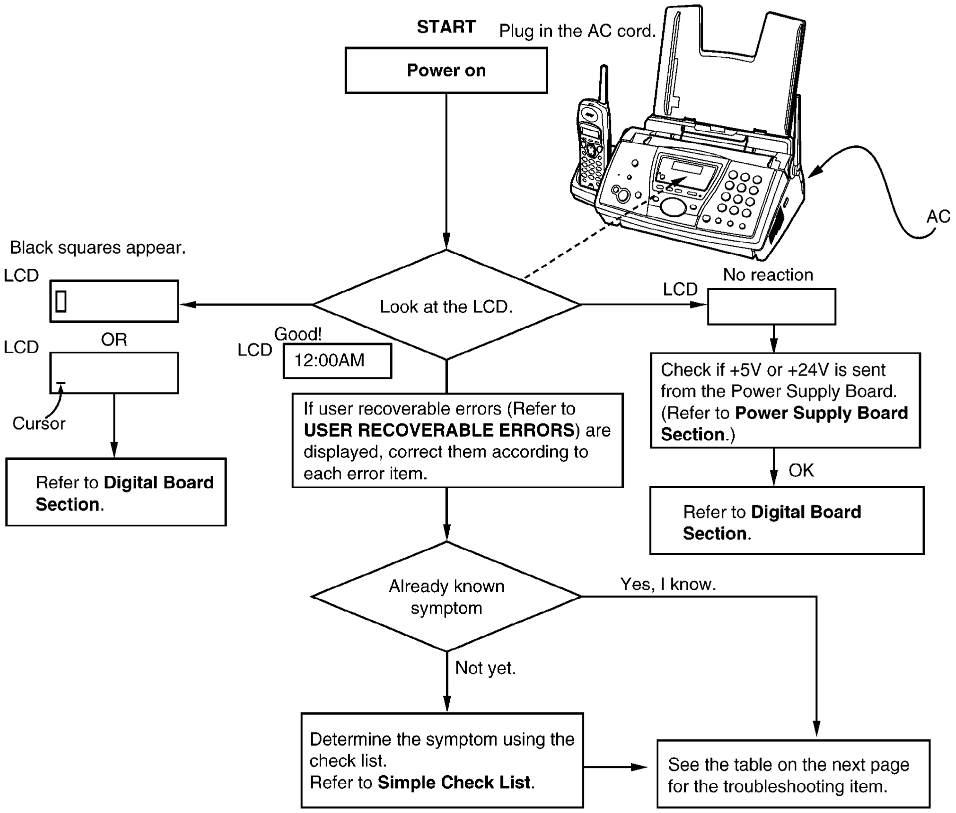
7.6. TROUBLESHOOTING DETAILS

7.6.1. Outline

Troubleshooting is for recovering quality and reliability by determining the broken component and replacing, adjusting or cleaning it as required. First, determine the problem then decide the troubleshooting method. If you have difficulty finding the broken part, determine which board is broken. (For example: the Digital PCB, Analog PCB, etc.) The claim tag from a customer or dealer may use different expressions for the same problem, as they are not a technician or engineer. Using your experience, test the problem area corresponding to the claim. Also, returns from a customer or dealer often have a claim tag. For these cases as well, you need to determine the problem. Test the unit using the simple check list on Simple Check List(). Difficult problems may be hard to determine, so repeated testing is necessary.

7.6.2. Starting Troubleshooting

Determine the symptom and the troubleshooting method.


START
Plug in the AC cord.
Power on
AC
Black squares appear.
LCD
Look at the LCD.
No reaction
LCD
LCD
OR
Good!
LCD
12:00AM
Cursor
Refer to Digital Board Section.
If user recoverable errors (Refer to USER RECOVERABLE ERRORS) are displayed, correct them according to each error item.
Check if +5V or +24V is sent from the Power Supply Board. (Refer to Power Supply Board Section.)
OK
Refer to Digital Board Section.
Already known symptom
Yes, I know.
Not yet.
Determine the symptom using the check list.
Refer to Simple Check List.
See the table on the next page for the troubleshooting item.

CROSS REFERENCE:

USER RECOVERABLE ERRORS()

Simple Check List()

Digital Board Section()

Power Supply Board Section()

7.6.3. Troubleshooting Items Table

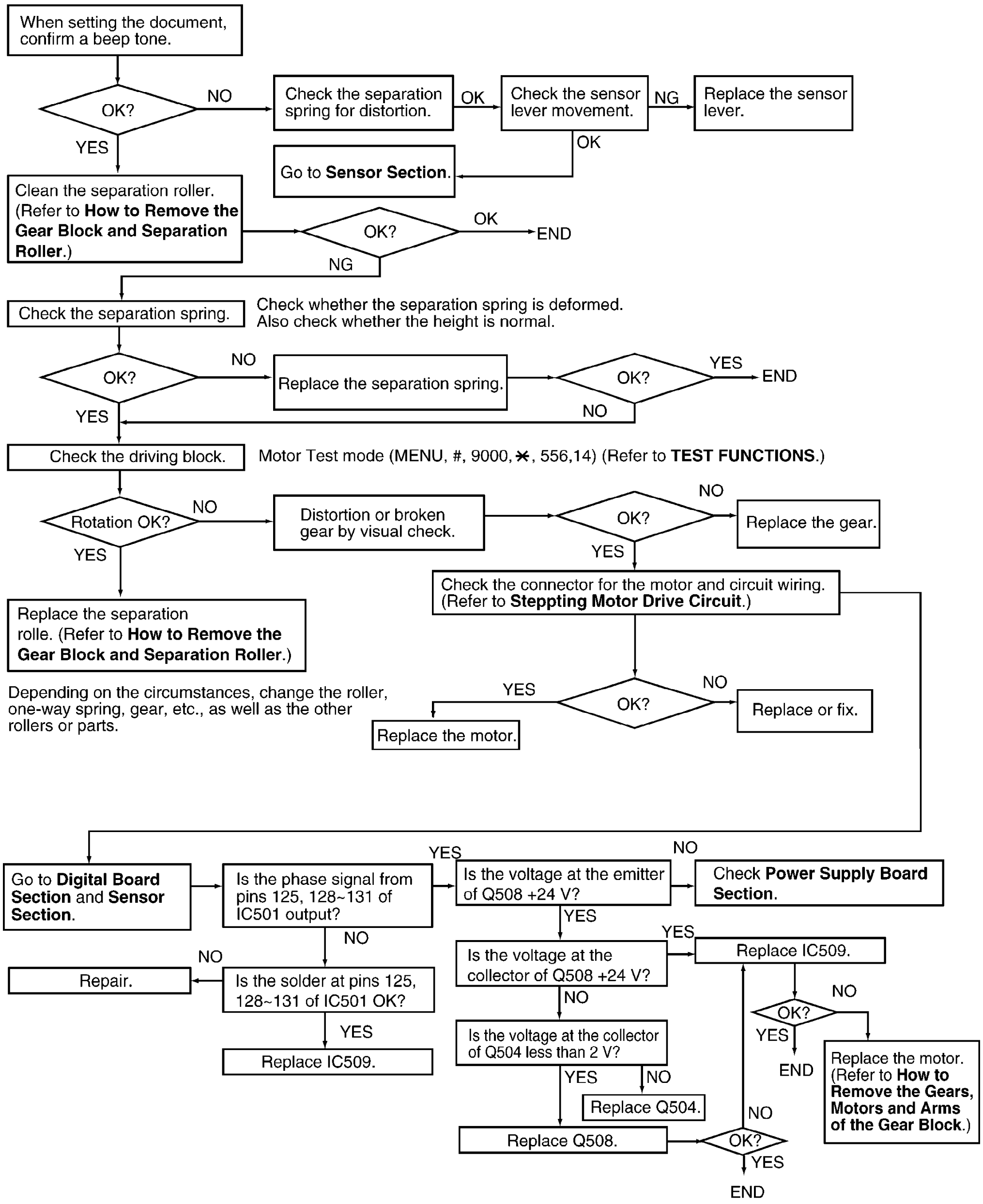
ITEM	SYMPTOM	REFERENCE
ADF (Auto Document Feeder)	The document does not feed.	See No Document Feed ()
	Document jam	See Document Jam ()
	Multiple feed	See Multiple Feed ()
	Skew	See Skew ()
Recording paper feed	The recording paper does not feed.	See The Recording Paper does not
	Paper jam	See Paper Jam ()
	Multiple feed and skew	See Multiple Feed and Skew ()
Printing	The sent fax data is skewed.	See The Sent Fax Data is Skewed (
	The received fax data is skewed.	See The Received Fax Data is Skev
	The received or copied data is expanded.	See Received or Copied Data is Ex
	A black page is copied.	See A Blank Page is Copied ()
	A blank page is received.	See A Blank Page is Received ()
	Black or white vertical line	See Black or White Vertical Line ()
	Black or white lateral line on print out	See Black or White Lateral Line on
	An abnormal image is printed	See An Abnormal Image is Printed
Communication FAX, TEL (analog board)	Cannot communicate by fax. An error code is displayed.	See Communication Section () and Output the Journal Report ()
	Cannot talk. The DTMF tone doesn't work. The handset / monitor doesn't work, etc.	See Analog Board Section ()
Operation panel	Keys are not accepted.	See Operation Panel Section ()
Sensor	If the electric circuit is the cause, the error message corresponding to the sensor will be displayed.	See Sensor Section ()
Cordless	No link	See Check Link ()
	Battery won't charge	See Battery won't Charge (Analog and Battery won't Charge (Handset
	No voice reception	See No Voice Reception ()
	No voice transmission	See No Voice Transmission ()

7.6.3.1. Simple Check List

SERIAL NO.		DATE	
FUNCTION		JUDGEMENT	REFERENCE
FAX operation	Transmission	OK / NG	
	Receiving	OK / NG	
Copy operation		OK / NG	
Telephone operation	Handset transceiver / receiver	OK / NG	
	SP-PHONE sound	OK / NG	
	Ringer sound	OK / NG	
	Dial operation	OK / NG	
	Volume operation	OK / NG	
	VOX detection	OK / NG	Service code #815 (Refer to TEST FUNCTION
Operation Panel	Key check	OK / NG	Service code #561 (Refer to TEST FUNCTION
	LED check	OK / NG	Service code #557 (Refer to TEST FUNCTION
	LCD check	OK / NG	Service code #558 (Refer to TEST FUNCTION
Sensor	Sensor check	OK / NG	Service code #815 (Refer to TEST FUNCTION
Clock	Display changing	OK / NG	Is the time kept correctly? Check with another clock.
Digital TAM	Greeting REC / PLAY	OK / NG	
	Incoming message REC / PLAY	OK / NG	
	Memo REC / PLAY	OK / NG	
Voice prompt		OK / NG	Service code #784 (Refer to TEST FUNCTION Check whether voice pron play or not.
Cordless Operation	Portable handset	OK / NG	
	Link	OK / NG	
	Battery charge	OK / NG	

7.6.4. ADF (Auto Document Feed) Section

7.6.4.1. No Document Feed


When setting the document, confirm a beep tone.
OK?
NO
YES
Check the separation spring for distortion.
OK
Check the sensor lever movement.
NG
Replace the sensor lever.
OK
Go to Sensor Section.
Clean the separation roller. (Refer to How to Remove the Gear Block and Separation Roller.)
OK?
OK
END
NG
Check the separation spring.
Check whether the separation spring is deformed. Also check whether the height is normal.
OK?
NO
YES
Replace the separation spring.
OK?
YES
END
NO
Check the driving block.
Motor Test mode (MENU, #, 9000, ✱, 556,14) (Refer to TEST FUNCTIONS.)
Rotation OK?
NO
YES
Distortion or broken gear by visual check.
OK?
NO
Replace the gear.
YES
Check the connector for the motor and circuit wiring. (Refer to Steppting Motor Drive Circuit.)
Replace the separation rolle. (Refer to How to Remove the Gear Block and Separation Roller.)
Depending on the circumstances, change the roller, one-way spring, gear, etc., as well as the other rollers or parts.
YES
OK?
NO
Replace or fix.
Replace the motor.
Go to Digital Board Section and Sensor Section.
Is the phase signal from pins 125, 128~131 of IC501 output?
YES
Is the voltage at the emitter of Q508 +24 V?
NO
Check Power Supply Board Section.
NO
YES
Is the voltage at the collector of Q508 +24 V?
YES
Replace IC509.
NO
Repair.
Is the solder at pins 125, 128~131 of IC501 OK?
YES
Replace IC509.
NO
Is the voltage at the collector of Q504 less than 2 V?
OK?
NO
YES
END
Replace the motor. (Refer to How to Remove the Gears, Motors and Arms of the Gear Block.)
YES
NO
Replace Q504.
NO
Replace Q508.
OK?
YES
END

CROSS REFERENCE:

Digital Board Section()

Power Supply Board Section()

Sensor Section()

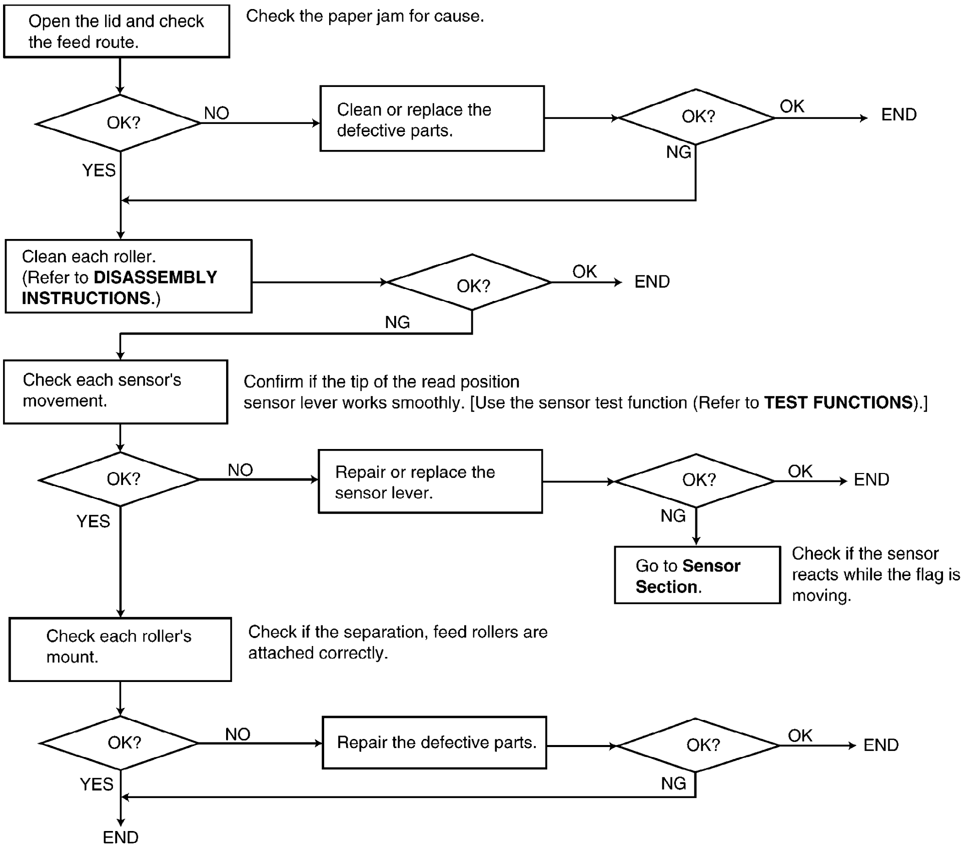
TEST FUNCTIONS()

How to Remove the Gear Block and Separation Roller()

How to Remove the Gears, Motors and Arms of the Gear Block()

Stepping Motor Drive Circuit (RX)()

7.6.4.2. Document Jam


Open the lid and check the feed route.
Check the paper jam for cause.
OK?
NO
Clean or replace the defective parts.
OK?
OK
END
NG
YES
Clean each roller. (Refer to **DISASSEMBLY INSTRUCTIONS**.)
OK?
OK
END
NG
Check each sensor's movement.
Confirm if the tip of the read position sensor lever works smoothly. [Use the sensor test function (Refer to **TEST FUNCTIONS**).]
OK?
NO
Repair or replace the sensor lever.
OK?
OK
END
NG
Go to **Sensor Section**.
Check if the sensor reacts while the flag is moving.
YES
Check each roller's mount.
Check if the separation, feed rollers are attached correctly.
OK?
NO
Repair the defective parts.
OK?
OK
END
NG
YES
END

CROSS REFERENCE:

TEST FUNCTIONS()

Sensor Section()

DISASSEMBLY INSTRUCTIONS()

7.6.4.3. Multiple Feed

- When using thick paper etc., sometimes the document will not be fed.

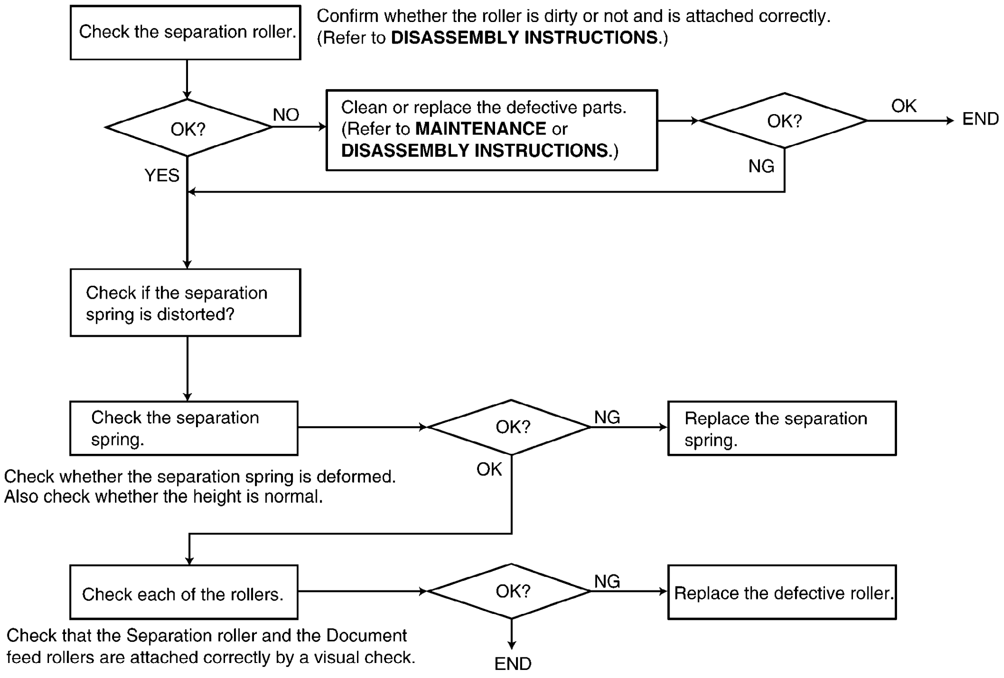
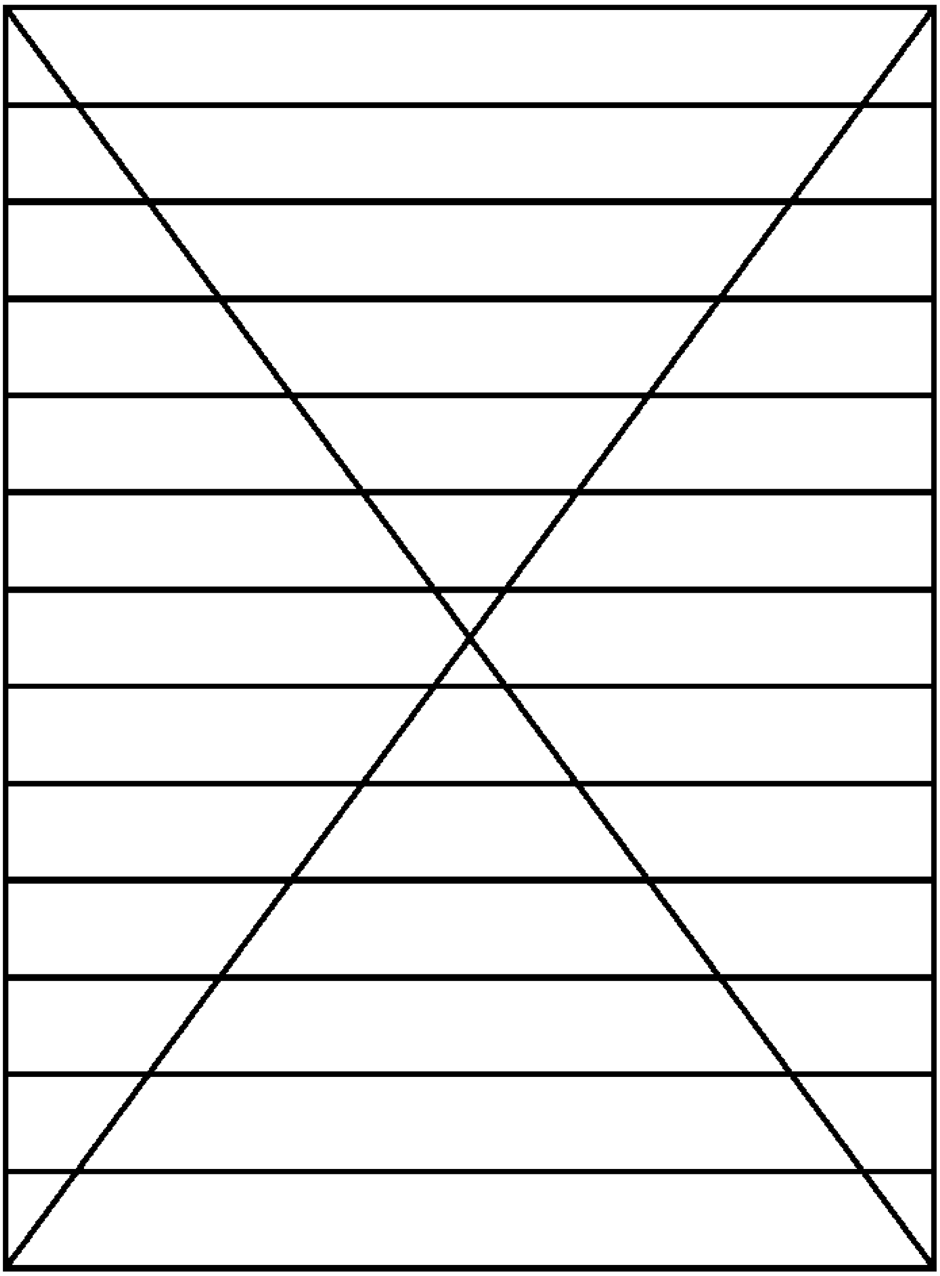

Check the separation roller.
Confirm whether the roller is dirty or not and is attached correctly.
(Refer to DISASSEMBLY INSTRUCTIONS.)
OK?
NO
YES
Clean or replace the defective parts.
(Refer to MAINTENANCE or
DISASSEMBLY INSTRUCTIONS.)
OK?
OK
END
NG
Check if the separation spring is distorted?
Check the separation spring.
OK?
NG
Replace the separation spring.
OK
Check whether the separation spring is deformed.
Also check whether the height is normal.
Check each of the rollers.
OK?
NG
Replace the defective roller.
Check that the Separation roller and the Document feed rollers are attached correctly by a visual check.
END

Fig. B



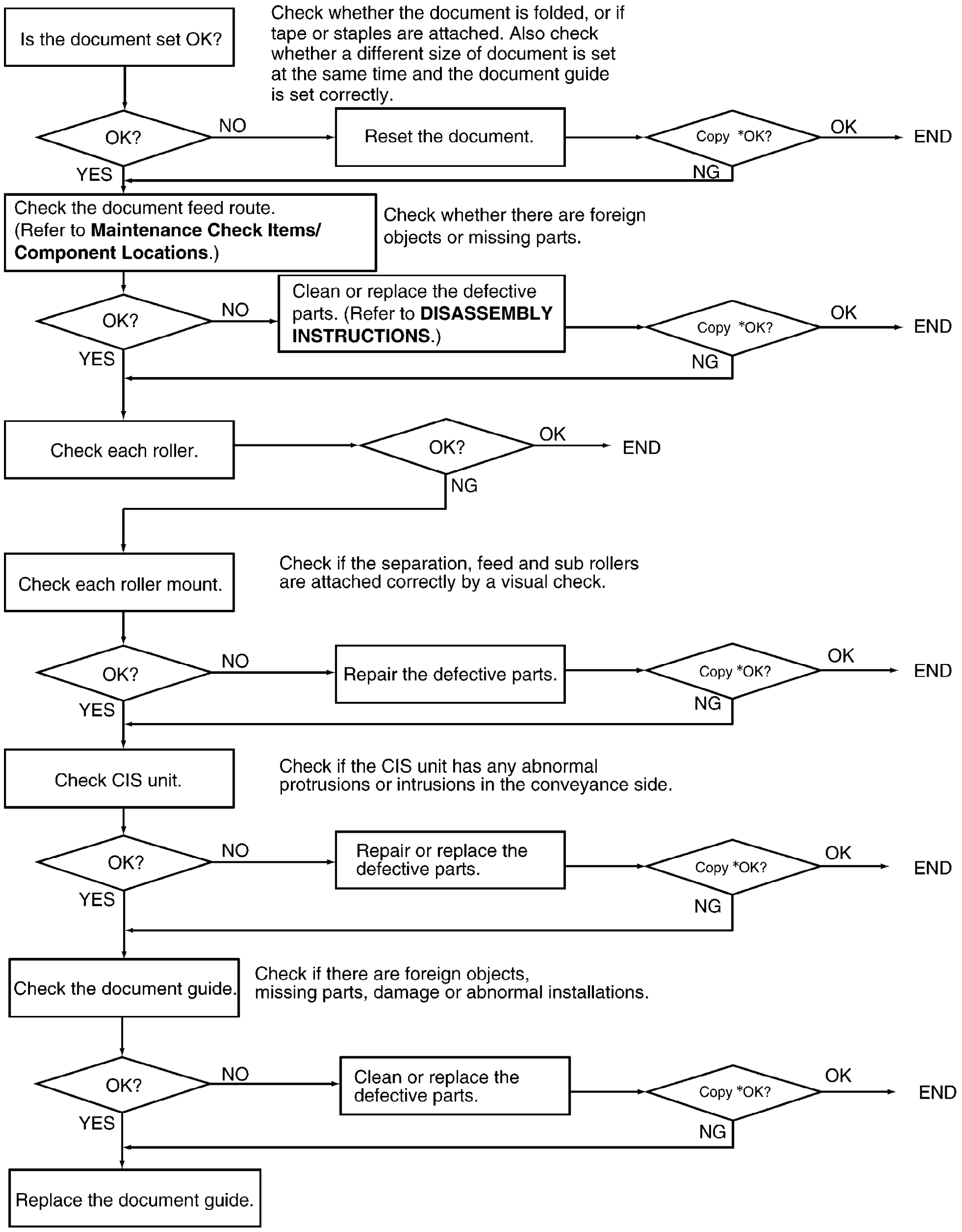
CROSS REFERENCE:

MAINTENANCE()
DISASSEMBLY INSTRUCTIONS()

Note:

When confirming if the characters are extended or distorted, or if the feed problem is occurred, use this test chart format (Fig. B).

7.6.4.4. Skew


Is the document set OK?
Check whether the document is folded, or if tape or staples are attached. Also check whether a different size of document is set at the same time and the document guide is set correctly.
OK?
NO
YES
Reset the document.
Copy *OK?
OK
NG
END
Check the document feed route. (Refer to Maintenance Check Items/ Component Locations.)
Check whether there are foreign objects or missing parts.
OK?
NO
YES
Clean or replace the defective parts. (Refer to DISASSEMBLY INSTRUCTIONS.)
Copy *OK?
OK
NG
END
Check each roller.
OK?
OK
NG
END
Check each roller mount.
Check if the separation, feed and sub rollers are attached correctly by a visual check.
OK?
NO
YES
Repair the defective parts.
Copy *OK?
OK
NG
END
Check CIS unit.
Check if the CIS unit has any abnormal protrusions or intrusions in the conveyance side.
OK?
NO
YES
Repair or replace the defective parts.
Copy *OK?
OK
NG
END
Check the document guide.
Check if there are foreign objects, missing parts, damage or abnormal installations.
OK?
NO
YES
Clean or replace the defective parts.
Copy *OK?
OK
NG
END
Replace the document guide.

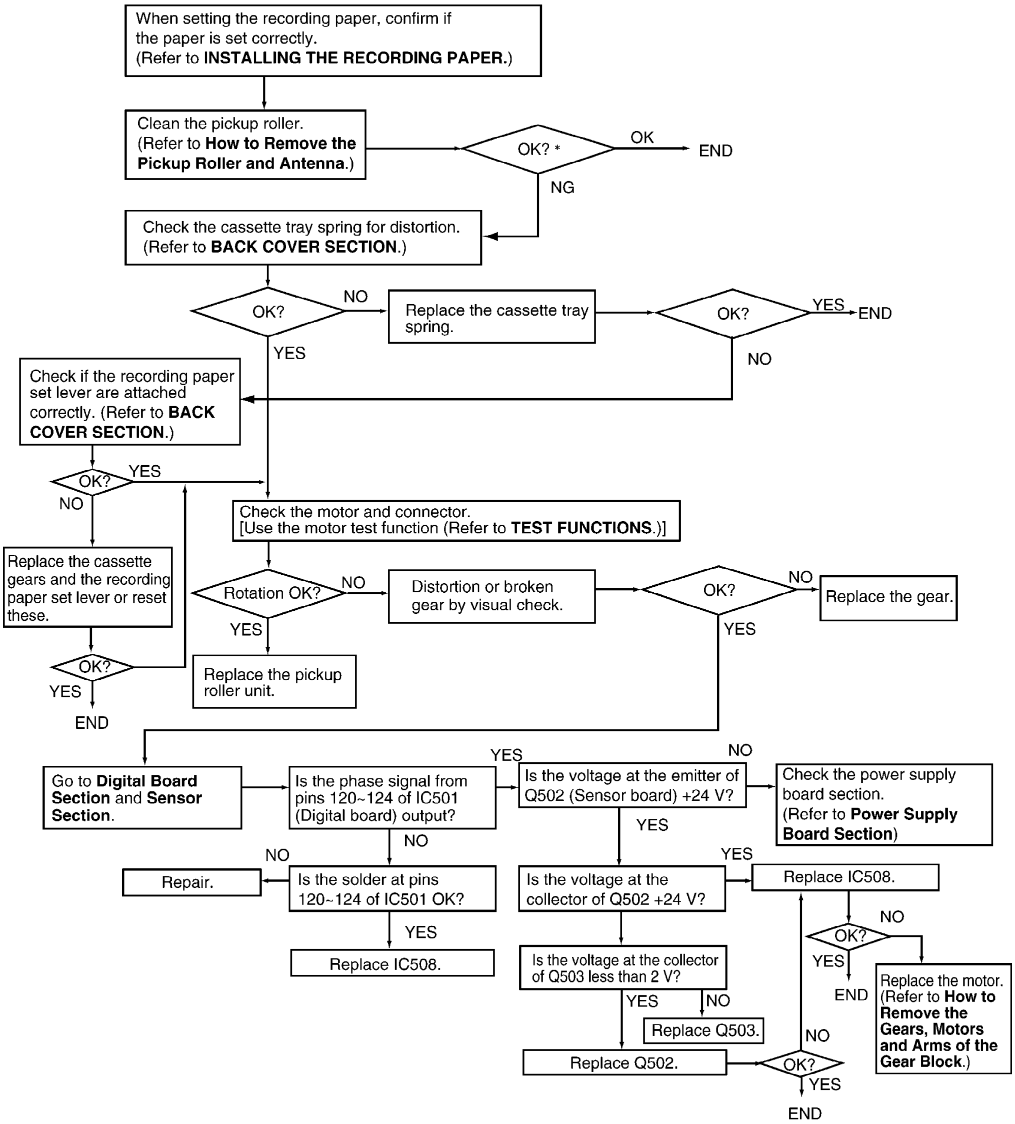
*** We recommend making a copy of the Fig. B document in Multiple Feed () and using it.**

CROSS REFERENCE:

Maintenance Check Items/Component Locations()

DISASSEMBLY INSTRUCTIONS()

7.6.4.5. The Recording Paper does not Feed


When setting the recording paper, confirm if the paper is set correctly. (Refer to INSTALLING THE RECORDING PAPER.)
Clean the pickup roller. (Refer to How to Remove the Pickup Roller and Antenna.)
OK? *
OK
END
NG
Check the cassette tray spring for distortion. (Refer to BACK COVER SECTION.)
OK?
NO
Replace the cassette tray spring.
OK?
YES
END
NO
YES
Check if the recording paper set lever are attached correctly. (Refer to BACK COVER SECTION.)
OK?
YES
NO
Check the motor and connector. [Use the motor test function (Refer to TEST FUNCTIONS.)]
Replace the cassette gears and the recording paper set lever or reset these.
Rotation OK?
NO
Distortion or broken gear by visual check.
OK?
NO
Replace the gear.
YES
YES
Replace the pickup roller unit.
OK?
YES
END
Go to Digital Board Section and Sensor Section.
Is the phase signal from pins 120~124 of IC501 (Digital board) output?
YES
Is the voltage at the emitter of Q502 (Sensor board) +24 V?
NO
Check the power supply board section. (Refer to Power Supply Board Section)
NO
YES
NO
Repair.
Is the solder at pins 120~124 of IC501 OK?
YES
Replace IC508.
Is the voltage at the collector of Q502 +24 V?
YES
Replace IC508.
NO
OK?
YES
END
Replace the motor. (Refer to How to Remove the Gears, Motors and Arms of the Gear Block.)
Is the voltage at the collector of Q503 less than 2 V?
YES
NO
Replace Q503.
NO
Replace Q502.
OK?
YES
END

*** We recommend making a copy of the Fig. B document in Multiple Feed ()and using it.**

CROSS REFERENCE:

INSTALLING THE RECORDING PAPER()

Digital Board Section()

Power Supply Board Section()

Sensor Section()

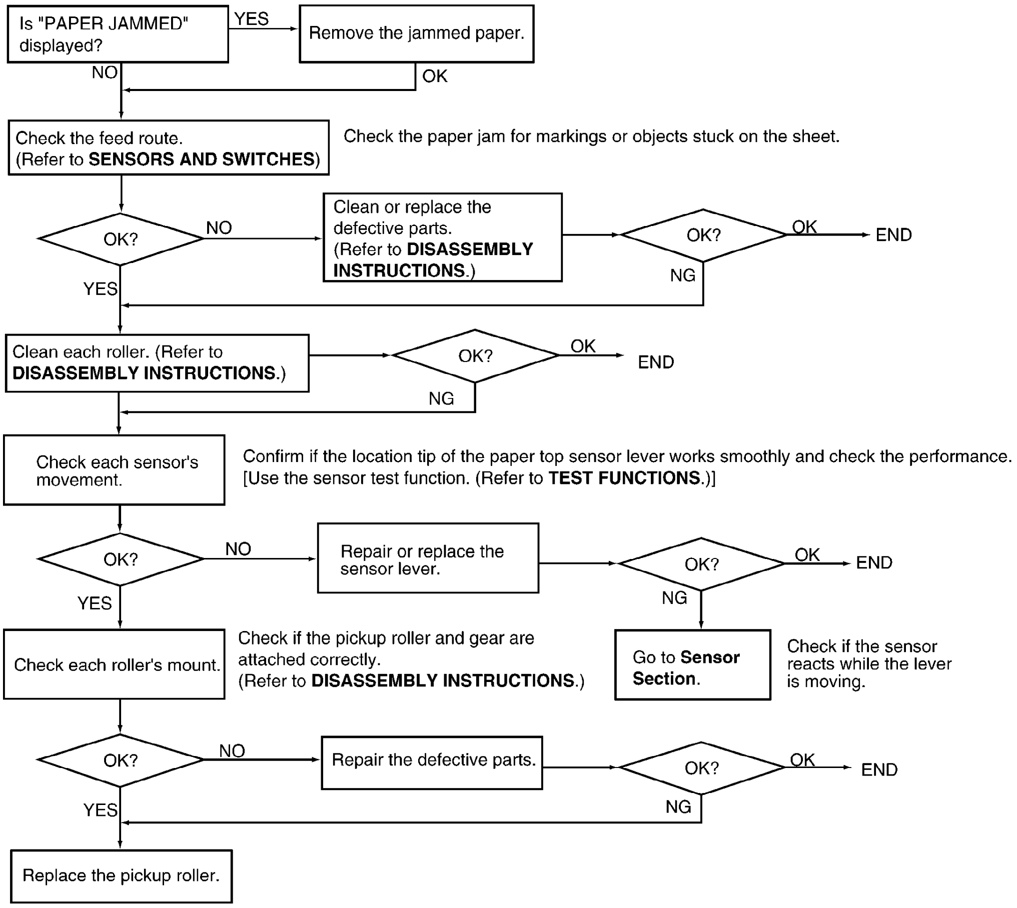
TEST FUNCTIONS()

How to Remove the Pickup Roller and Antenna()

How to Remove the Gears, Motors and Arms of the Gear Block()

BACK COVER SECTION()

7.6.4.6. Paper Jam


Is "PAPER JAMMED" displayed?
YES
Remove the jammed paper.
NO
OK
Check the feed route. (Refer to SENSORS AND SWITCHES)
Check the paper jam for markings or objects stuck on the sheet.
OK?
NO
Clean or replace the defective parts. (Refer to DISASSEMBLY INSTRUCTIONS.)
OK?
OK
END
NG
YES
Clean each roller. (Refer to DISASSEMBLY INSTRUCTIONS.)
OK?
OK
END
NG
Check each sensor's movement.
Confirm if the location tip of the paper top sensor lever works smoothly and check the performance. [Use the sensor test function. (Refer to TEST FUNCTIONS.)]
OK?
NO
Repair or replace the sensor lever.
OK?
OK
END
NG
YES
Check each roller's mount.
Check if the pickup roller and gear are attached correctly. (Refer to DISASSEMBLY INSTRUCTIONS.)
Go to Sensor Section.
Check if the sensor reacts while the lever is moving.
OK?
NO
Repair the defective parts.
OK?
OK
END
NG
YES
Replace the pickup roller.

CROSS REFERENCE:

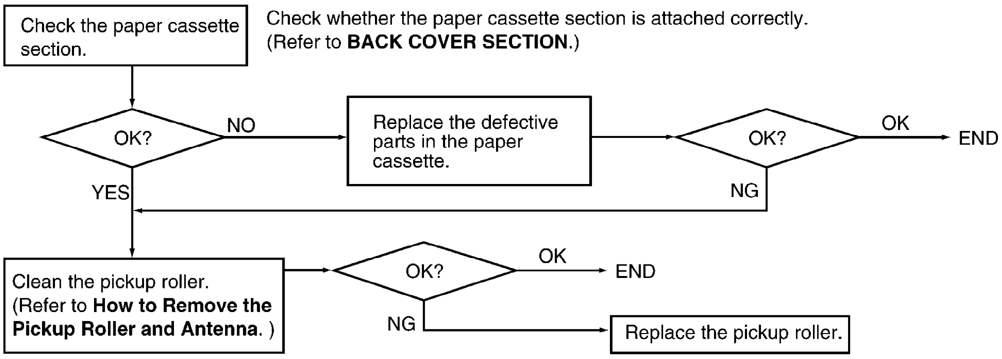
Sensor Section()

TEST FUNCTIONS()

DISASSEMBLY INSTRUCTIONS()

SENSORS AND SWITCHES()

7.6.4.7. Multiple Feed and Skew

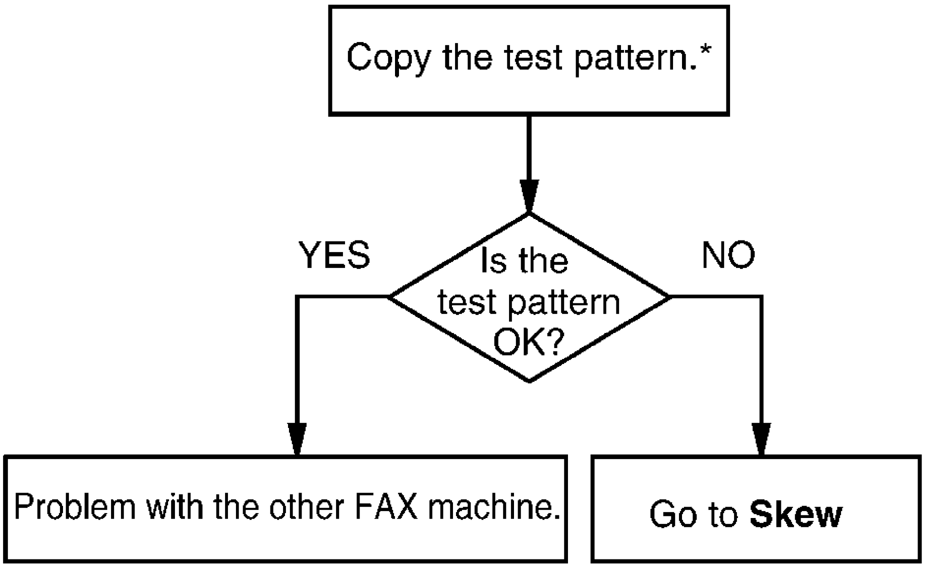

Check the paper cassette section.
Check whether the paper cassette section is attached correctly. (Refer to BACK COVER SECTION.)
OK?
NO
Replace the defective parts in the paper cassette.
OK?
OK
END
NG
YES
Clean the pickup roller. (Refer to How to Remove the Pickup Roller and Antenna.)
OK?
OK
END
NG
Replace the pickup roller.

CROSS REFERENCE:

How to Remove the Pickup Roller and Antenna()

BACK COVER SECTION()

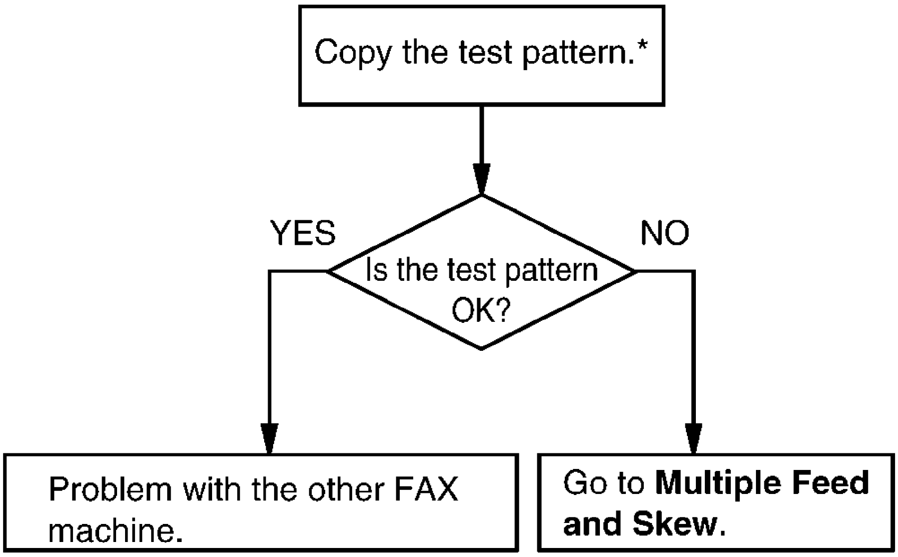
7.6.4.8. The Sent Fax Data is Skewed


Copy the test pattern.*
YES
Is the test pattern OK?
NO
Problem with the other FAX machine.
Go to **Skew**

* We recommend making a copy of the Fig. B document in Multiple Feed() and using it.

CROSS REFERENCE:
Skew()

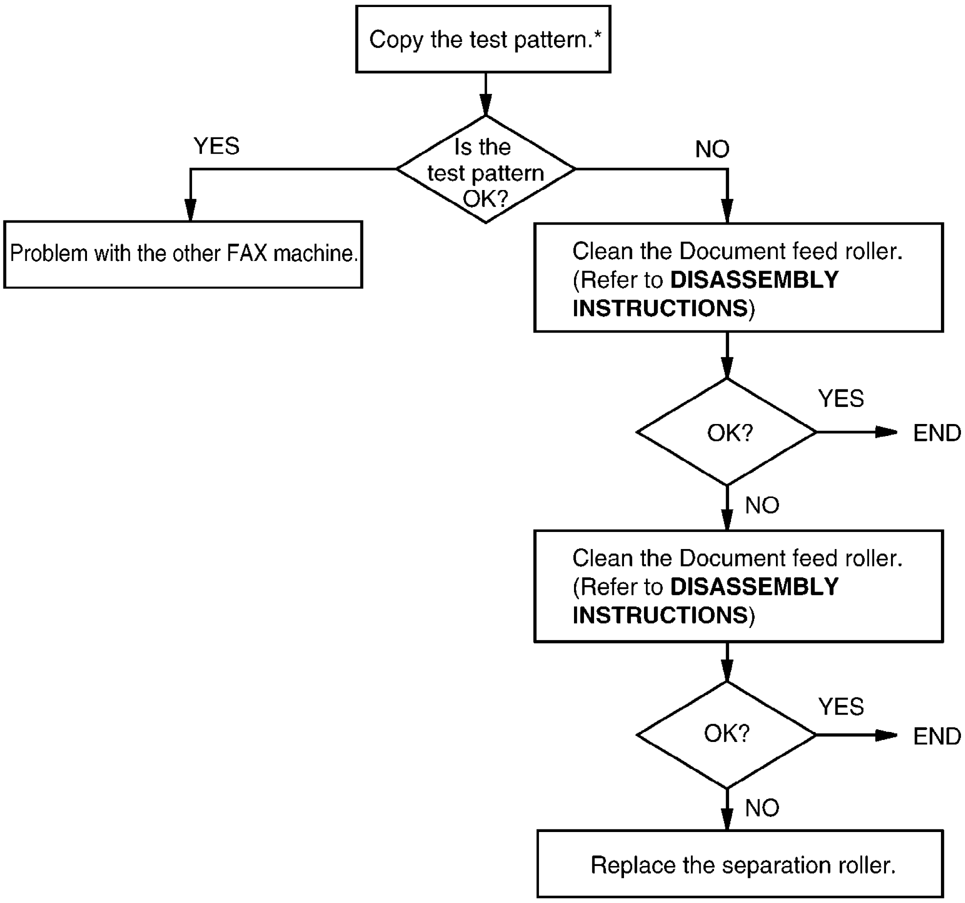
7.6.4.9. The Received Fax Data is Skewed


Copy the test pattern.*
YES
Is the test pattern OK?
NO
Problem with the other FAX machine.
Go to **Multiple Feed and Skew**.

* We recommend making a copy of the Fig. B document in Multiple Feed() and using it.

CROSS REFERENCE:
Multiple Feed and Skew()

7.6.4.10. Received or Copied Data is Expanded

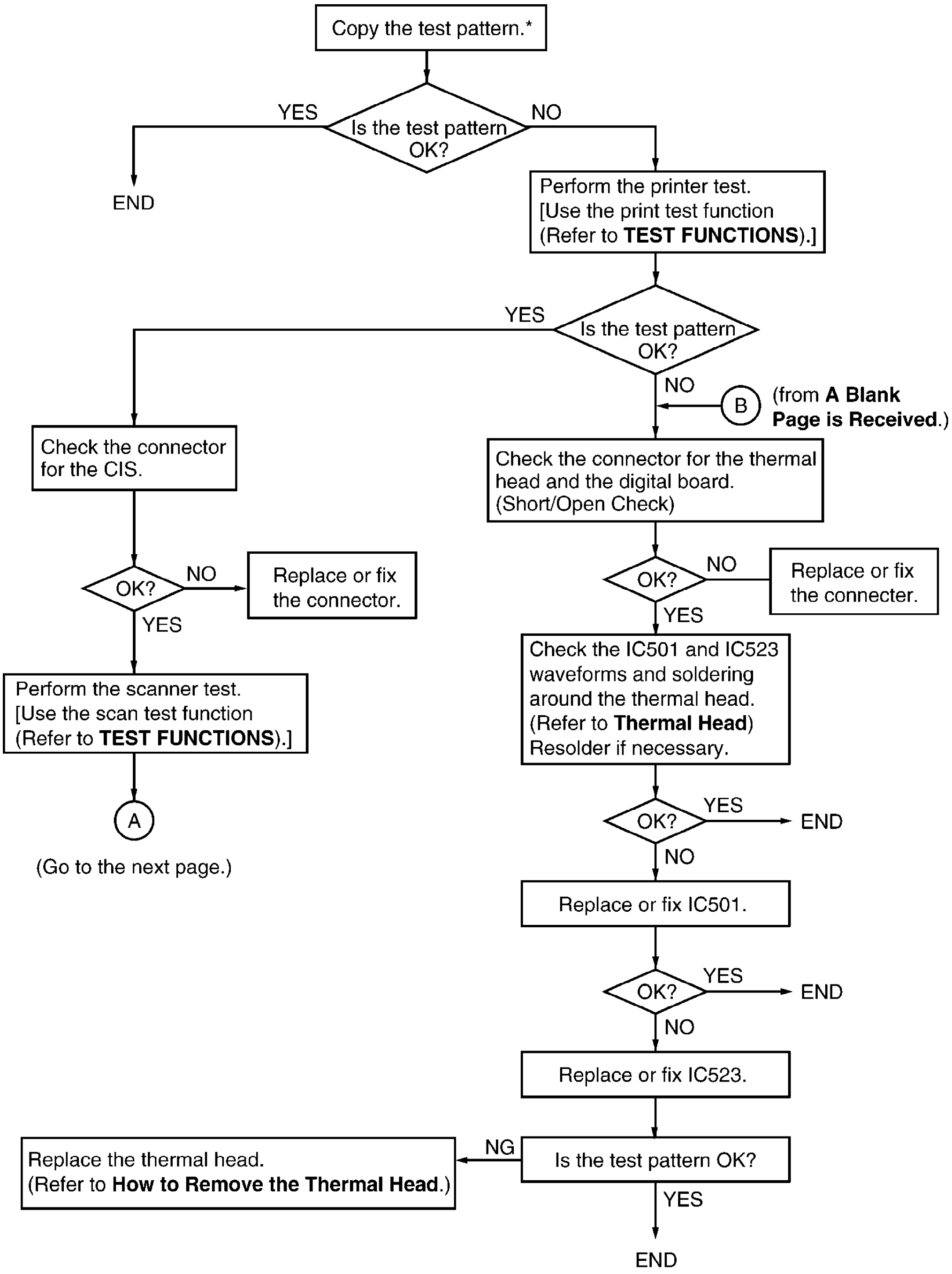

Copy the test pattern.*
Is the test pattern OK?
YES
NO
Problem with the other FAX machine.
Clean the Document feed roller. (Refer to **DISASSEMBLY INSTRUCTIONS**)
OK?
YES
END
NO
Clean the Document feed roller. (Refer to **DISASSEMBLY INSTRUCTIONS**)
OK?
YES
END
NO
Replace the separation roller.

*** We recommend making a copy of the Fig. B document in Multiple Feed() and using it.**

CROSS REFERENCE:

DISASSEMBLY INSTRUCTIONS()

7.6.4.11. A Blank Page is Copied


Copy the test pattern.*
Is the test pattern OK?
YES
NO
END
Perform the printer test. [Use the print test function (Refer to TEST FUNCTIONS).]
Is the test pattern OK?
YES
NO
B
(from A Blank Page is Received.)
Check the connector for the CIS.
Check the connector for the thermal head and the digital board. (Short/Open Check)
OK?
NO
Replace or fix the connector.
YES
OK?
NO
Replace or fix the connecter.
YES
Perform the scanner test. [Use the scan test function (Refer to TEST FUNCTIONS).]
Check the IC501 and IC523 waveforms and soldering around the thermal head. (Refer to Thermal Head) Resolder if necessary.
A
(Go to the next page.)
OK?
YES
END
NO
Replace or fix IC501.
OK?
YES
END
NO
Replace or fix IC523.
Replace the thermal head. (Refer to How to Remove the Thermal Head.)
NG
Is the test pattern OK?
YES
END

*** We recommend making a copy of the Fig. B document in Multiple Feed () and using it.**

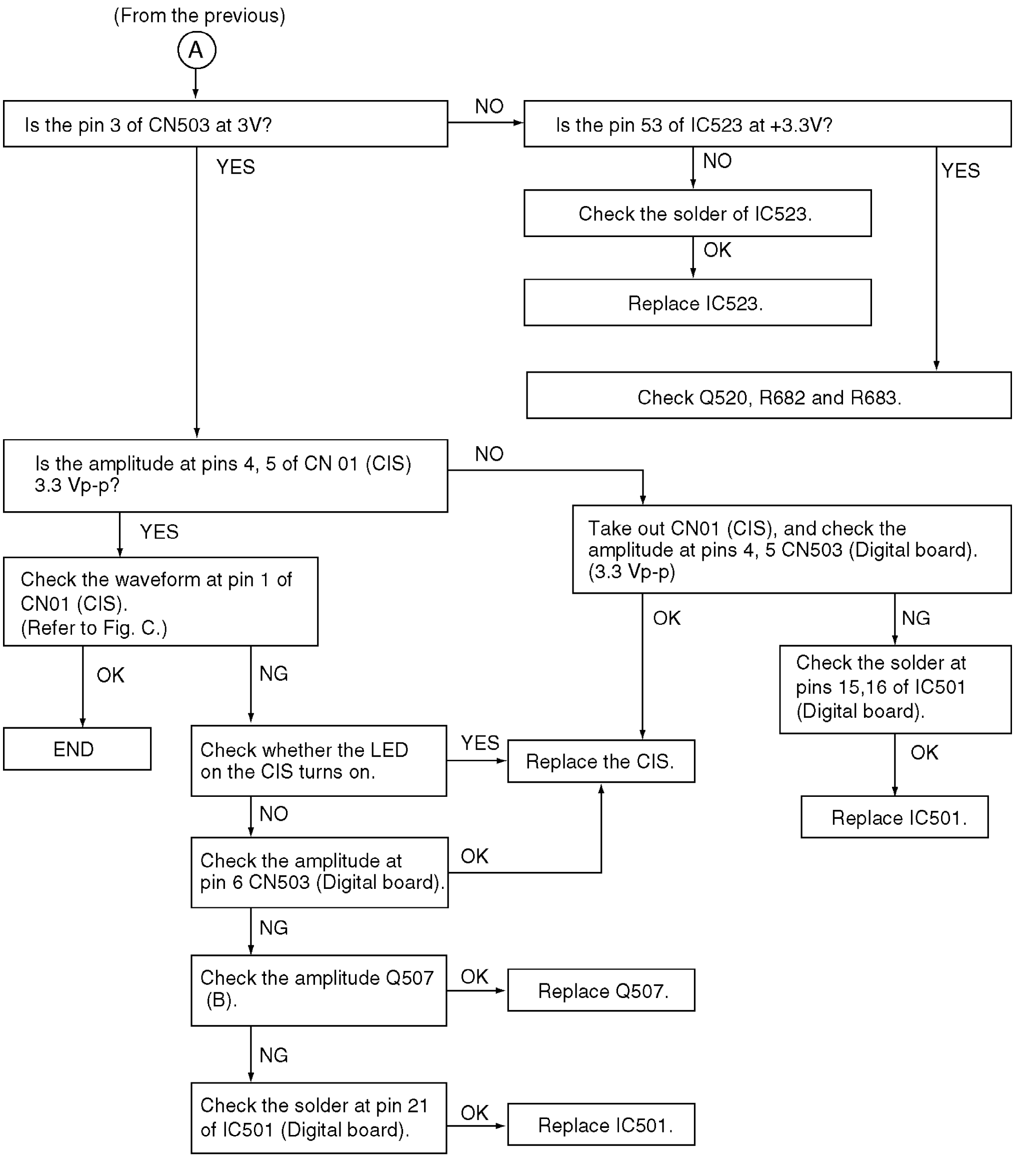
CROSS REFERENCE:

A Blank Page is Received()

TEST FUNCTIONS()

How to Remove the Thermal Head()

Thermal Head()


(From the previous)
A
Is the pin 3 of CN503 at 3V?
NO
Is the pin 53 of IC523 at +3.3V?
YES
NO
YES
Check the solder of IC523.
OK
Replace IC523.
Check Q520, R682 and R683.
Is the amplitude at pins 4, 5 of CN 01 (CIS) 3.3 Vp-p?
NO
YES
Take out CN01 (CIS), and check the amplitude at pins 4, 5 CN503 (Digital board). (3.3 Vp-p)
Check the waveform at pin 1 of CN01 (CIS). (Refer to Fig. C.)
OK
NG
OK
NG
Check the solder at pins 15,16 of IC501 (Digital board).
END
Check whether the LED on the CIS turns on.
YES
Replace the CIS.
OK
NO
Replace IC501.
Check the amplitude at pin 6 CN503 (Digital board).
OK
NG
Check the amplitude Q507 (B).
OK
Replace Q507.
NG
Check the solder at pin 21 of IC501 (Digital board).
OK
Replace IC501.

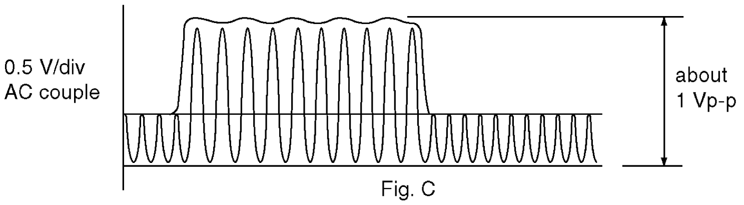
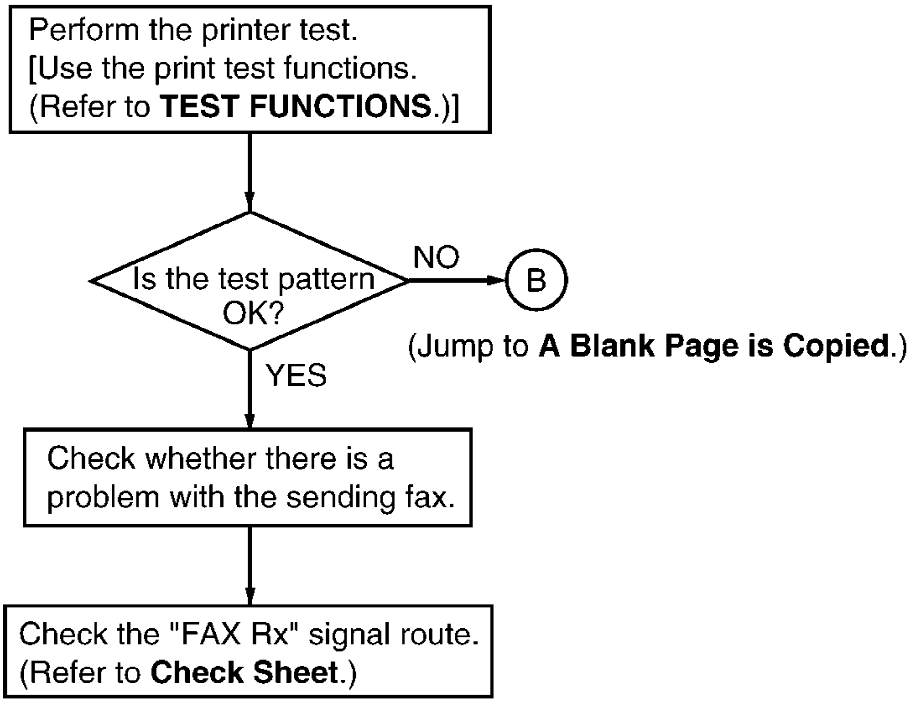


Fig. C

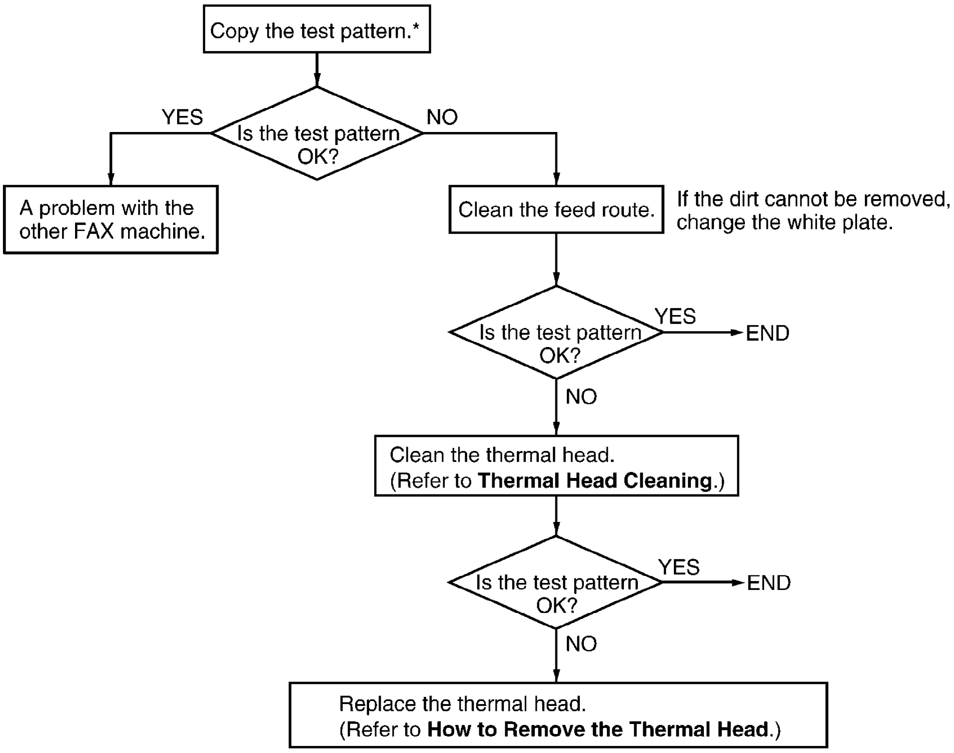
7.6.4.12. A Blank Page is Received


Perform the printer test.
[Use the print test functions.
(Refer to **TEST FUNCTIONS**.)]
Is the test pattern OK?
NO
B
(Jump to **A Blank Page is Copied**.)
YES
Check whether there is a problem with the sending fax.
Check the "FAX Rx" signal route.
(Refer to **Check Sheet**.)

CROSS REFERENCE:

A Blank Page is Copied()
Check Sheet()
TEST FUNCTIONS()

7.6.4.13. Black or White Vertical Line


Copy the test pattern.*
Is the test pattern OK?
YES
NO
A problem with the other FAX machine.
Clean the feed route.
If the dirt cannot be removed, change the white plate.
Is the test pattern OK?
YES
END
NO
Clean the thermal head.
(Refer to Thermal Head Cleaning.)
Is the test pattern OK?
YES
END
NO
Replace the thermal head.
(Refer to How to Remove the Thermal Head.)

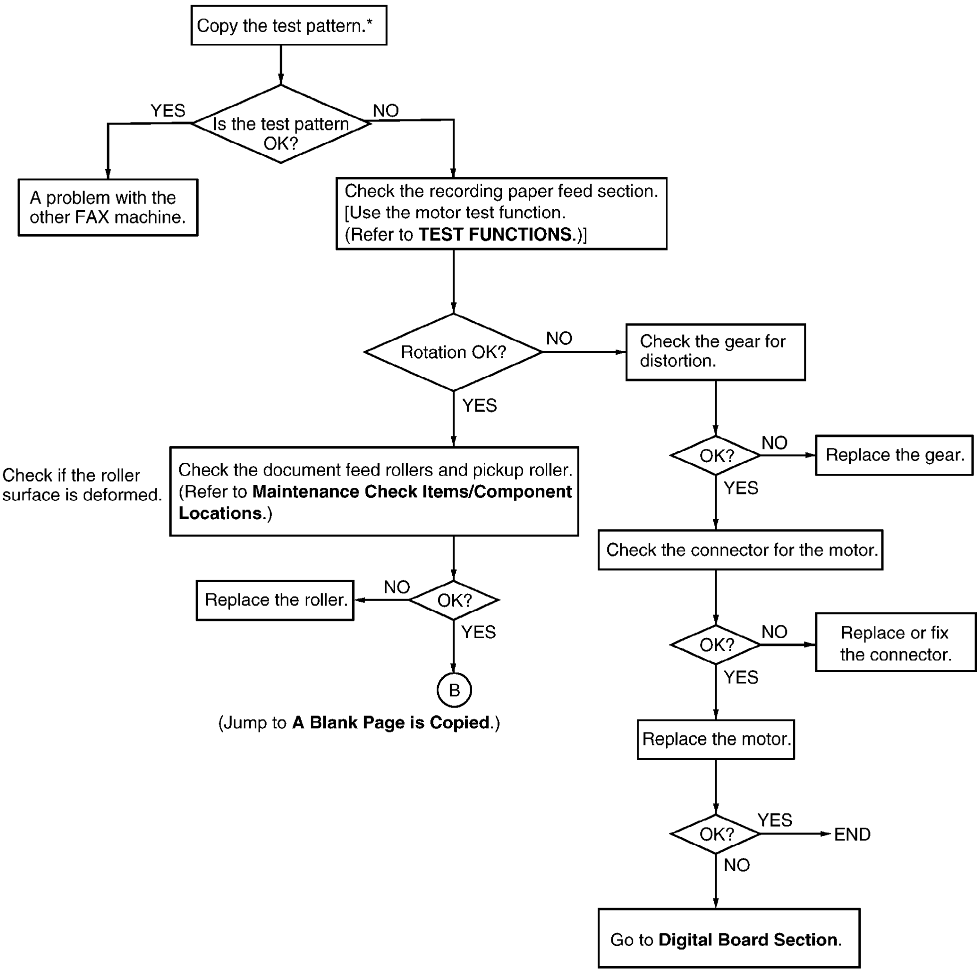
*** We recommend making a copy of the Fig. B document in Multiple Feed () and using it.**

CROSS REFERENCE:

Thermal Head Cleaning()

How to Remove the Thermal Head()

7.6.4.14. Black or White Lateral Line on Print Out


Copy the test pattern.*
Is the test pattern OK?
YES
NO
A problem with the other FAX machine.
Check the recording paper feed section. [Use the motor test function. (Refer to **TEST FUNCTIONS**.)]
Rotation OK?
NO
YES
Check the gear for distortion.
OK?
NO
Replace the gear.
YES
Check if the roller surface is deformed.
Check the document feed rollers and pickup roller. (Refer to **Maintenance Check Items/Component Locations**.)
Check the connector for the motor.
Replace the roller.
NO
OK?
YES
B
(Jump to **A Blank Page is Copied**.)
OK?
NO
Replace or fix the connector.
YES
Replace the motor.
OK?
YES
END
NO
Go to **Digital Board Section**.

*** We recommend making a copy of the Fig. B document in Multiple Feed() and using it.**

CROSS REFERENCE:

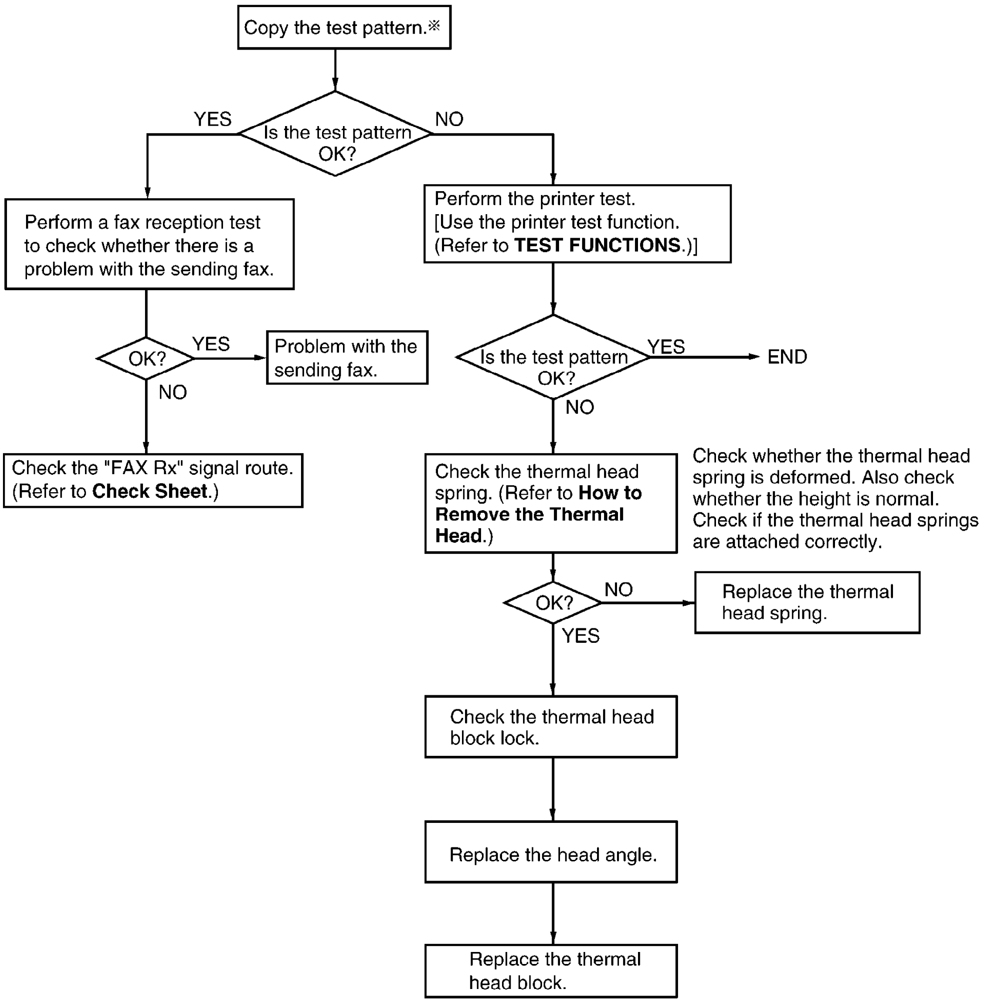
A Blank Page is Copied()

Digital Board Section()

TEST FUNCTIONS()

Maintenance Check Items/Component Locations()

7.6.4.15. An Abnormal Image is Printed



Copy the test pattern.※
Is the test pattern OK?
YES
NO
Perform a fax reception test to check whether there is a problem with the sending fax.
OK?
YES
NO
Problem with the sending fax.
Check the "FAX Rx" signal route. (Refer to Check Sheet.)
Perform the printer test. [Use the printer test function. (Refer to TEST FUNCTIONS.)]
Is the test pattern OK?
YES
END
NO
Check the thermal head spring. (Refer to How to Remove the Thermal Head.)
Check whether the thermal head spring is deformed. Also check whether the height is normal. Check if the thermal head springs are attached correctly.
OK?
NO
Replace the thermal head spring.
YES
Check the thermal head block lock.
Replace the head angle.
Replace the thermal head block.

*** We recommend making a copy of the Fig. B document in Multiple Feed () and using it.**

CROSS REFERENCE:

Check Sheet()

TEST FUNCTIONS()

How to Remove the Thermal Head()

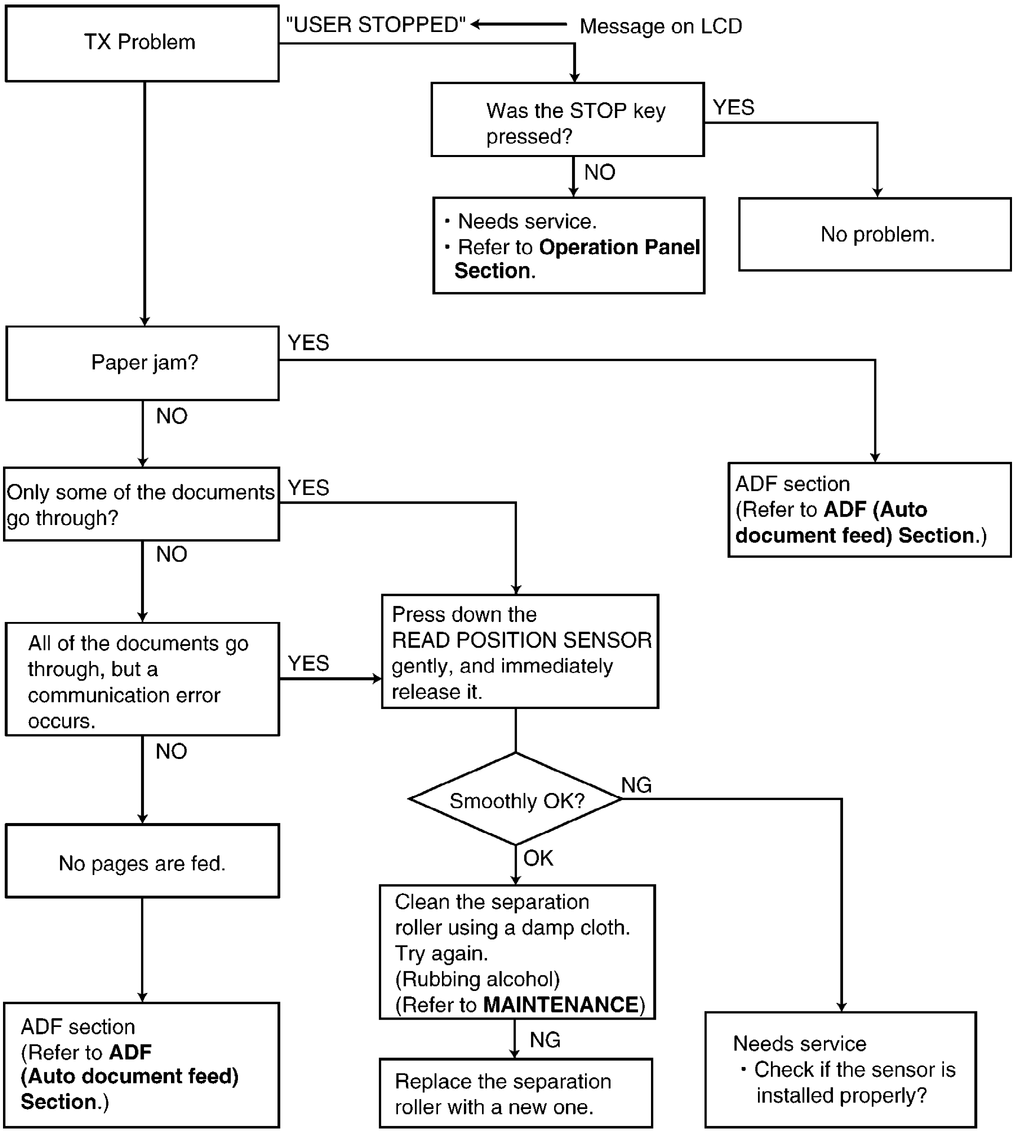
7.6.5. Communication Section

Find the problem in the table shown below, and refer to the corresponding troubleshooting procedure in Defective Facsimile Section .

No.	Symptom	Content	Possible cause
1	The paper is not fed properly when faxing. (Nor in the copy mode.)	Troubleshooting	Problem with the feeding mechanism.
2	The fax usually transmits successfully but sometimes fails. (The unit can copy documents.)	Troubleshooting	Problem with the service line or with the receiver's fax.
3	The fax usually receives successfully but sometimes fails. (The unit can copy documents.)	Troubleshooting	Problem with the service line or with the transmitter's fax.
4	The fax completely fails to transmit or receive. (The unit can copy documents.)	Troubleshooting	Problem with the electric circuit.
5	The fax fails either to transmit or receive when making a long distance or an international call. (The unit can copy documents.)	Detailed description of the possible causes (Similar to troubleshooting items No.2 and No.3.)	Problem with the service line.
6	The fax image is poor when transmitting or receiving during a long distance or an international call.		
7	No.1-No.5	The troubleshooting procedure for each error code will be printed on the communication result report.	

7.6.5.1. Defective Facsimile Section

7.6.5.1.1. Transmit Problem


TX Problem
"USER STOPPED"
Message on LCD
Was the STOP key pressed?
YES
NO
・Needs service.
・Refer to **Operation Panel Section**.
No problem.
Paper jam?
YES
NO
ADF section (Refer to **ADF (Auto document feed) Section**.)
Only some of the documents go through?
YES
NO
Press down the READ POSITION SENSOR gently, and immediately release it.
All of the documents go through, but a communication error occurs.
YES
NO
Smoothly OK?
NG
OK
No pages are fed.
Clean the separation roller using a damp cloth. Try again. (Rubbing alcohol) (Refer to **MAINTENANCE**)
NG
ADF section (Refer to **ADF (Auto document feed) Section**.)
Replace the separation roller with a new one.
Needs service
・Check if the sensor is installed properly?

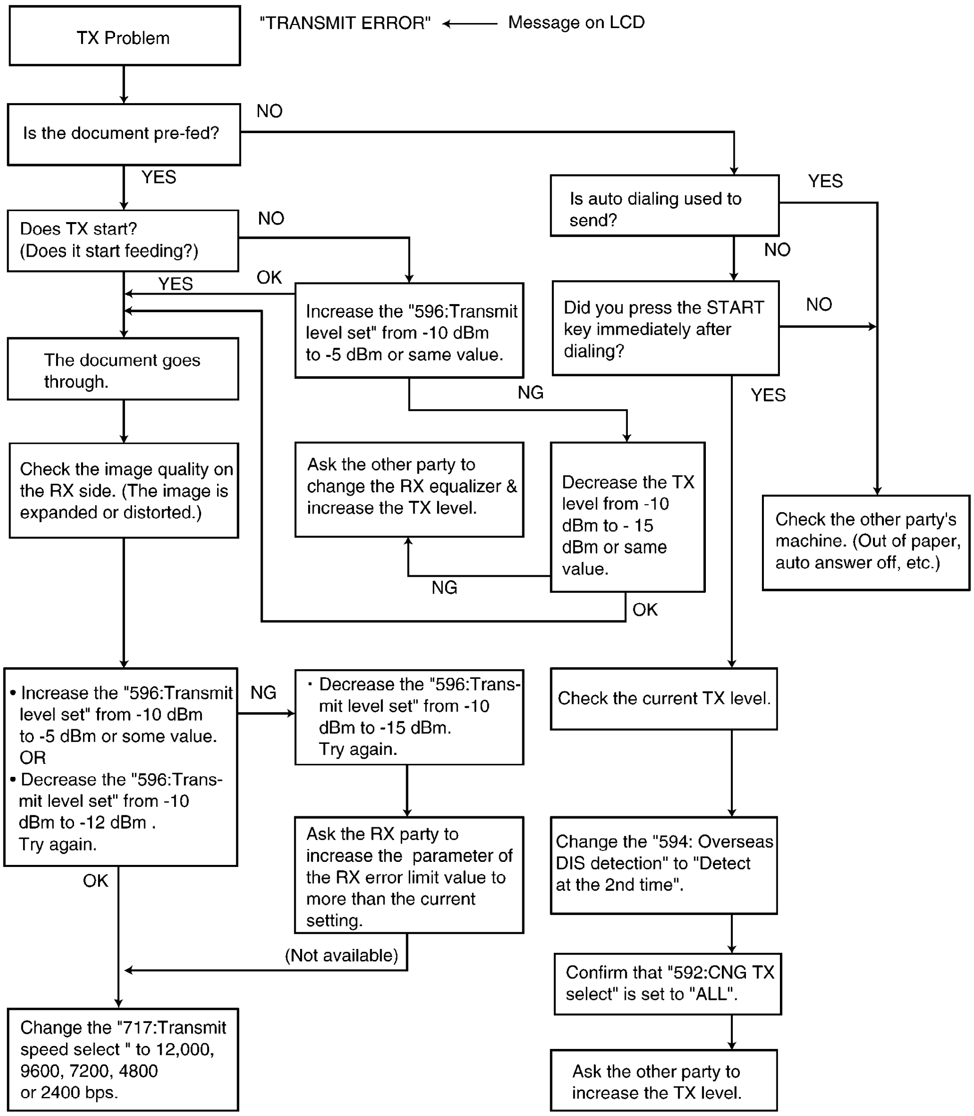
CROSS REFERENCE:

MAINTENANCE()

ADF (Auto Document Feed) Section()

Operation Panel Section()

7.6.5.1.2. Sometime There is a Transmit Problem

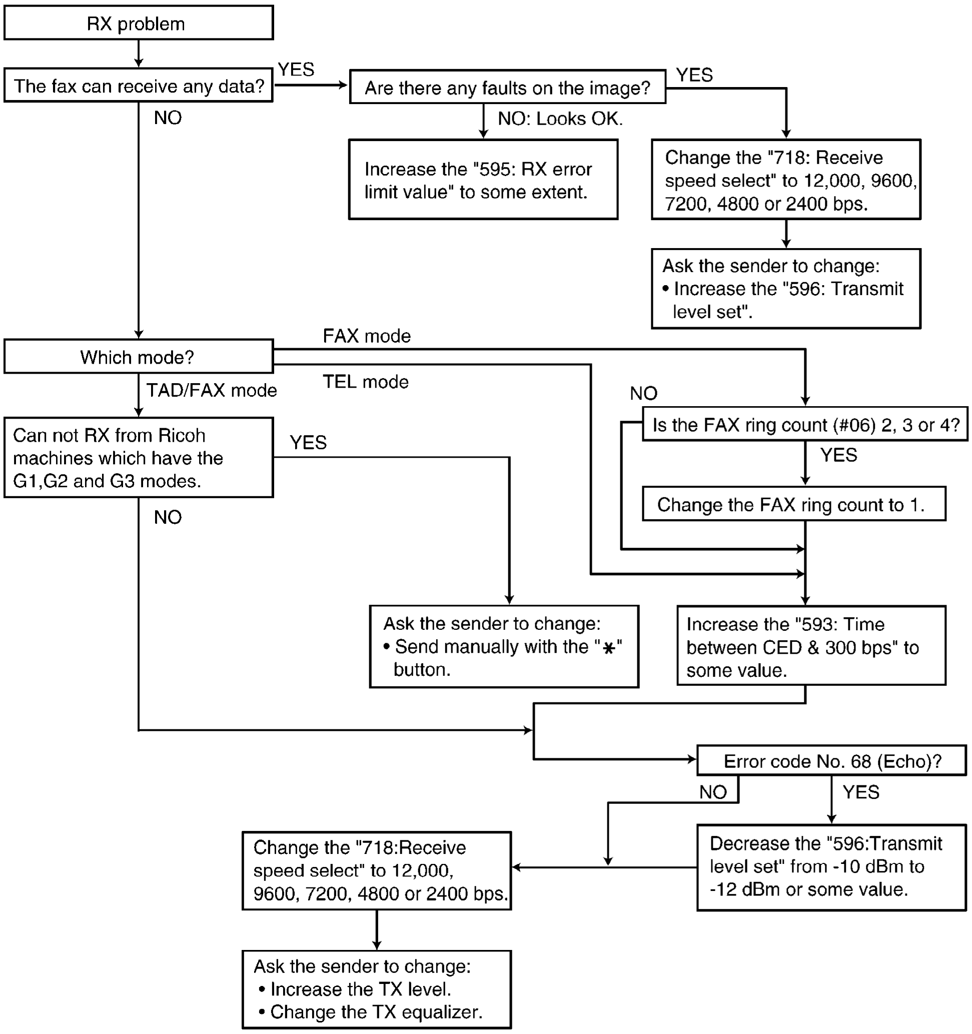

TX Problem
"TRANSMIT ERROR"
Message on LCD
Is the document pre-fed?
NO
YES
Does TX start? (Does it start feeding?)
NO
YES
OK
Is auto dialing used to send?
YES
NO
Increase the "596:Transmit level set" from -10 dBm to -5 dBm or same value.
Did you press the START key immediately after dialing?
NO
YES
NG
The document goes through.
Check the image quality on the RX side. (The image is expanded or distorted.)
Ask the other party to change the RX equalizer & increase the TX level.
Decrease the TX level from -10 dBm to - 15 dBm or same value.
NG
OK
Check the other party's machine. (Out of paper, auto answer off, etc.)
• Increase the "596:Transmit level set" from -10 dBm to -5 dBm or some value.
OR
• Decrease the "596:Transmit level set" from -10 dBm to -12 dBm . Try again.
NG
· Decrease the "596:Transmit level set" from -10 dBm to -15 dBm. Try again.
Check the current TX level.
OK
Ask the RX party to increase the parameter of the RX error limit value to more than the current setting.
Change the "594: Overseas DIS detection" to "Detect at the 2nd time".
(Not available)
Confirm that "592:CNG TX select" is set to "ALL".
Change the "717:Transmit speed select " to 12,000, 9600, 7200, 4800 or 2400 bps.
Ask the other party to increase the TX level.

Note:

"596: Transmit level set" represents a service code. (Refer to Service Function Table().)

7.6.5.1.3. Receive Problem

First confirm whether the recording paper is installed properly or not before starting troubleshooting. (Refer to "Remarks".)

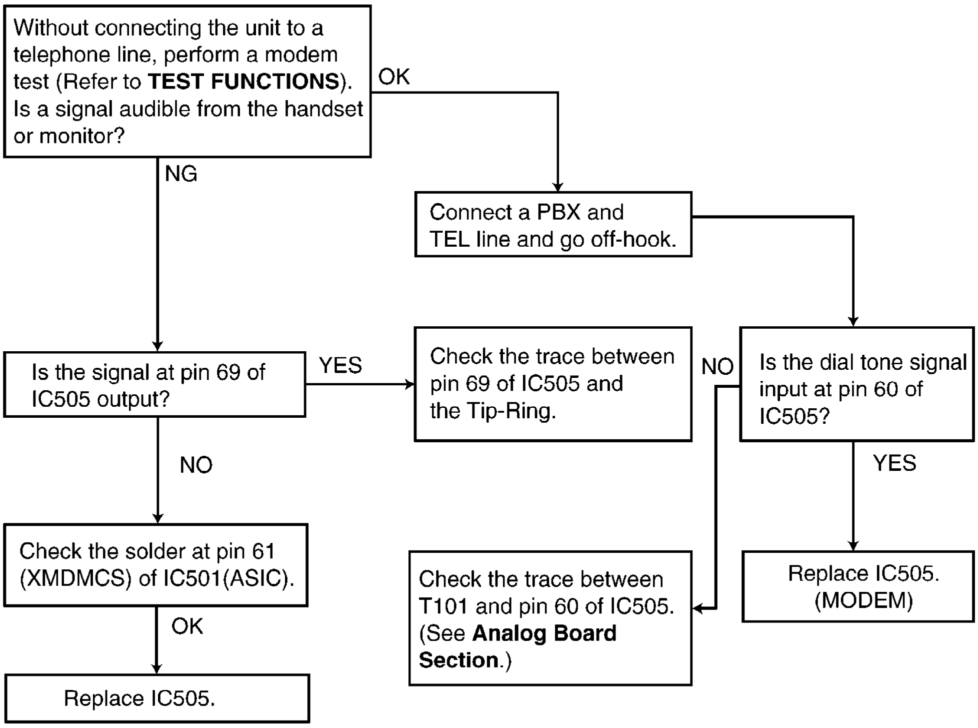

RX problem
The fax can receive any data?
YES
NO
Are there any faults on the image?
YES
NO: Looks OK.
Increase the "595: RX error limit value" to some extent.
Change the "718: Receive speed select" to 12,000, 9600, 7200, 4800 or 2400 bps.
Ask the sender to change:
• Increase the "596: Transmit level set".
Which mode?
FAX mode
TEL mode
TAD/FAX mode
NO
Is the FAX ring count (#06) 2, 3 or 4?
YES
Change the FAX ring count to 1.
Can not RX from Ricoh machines which have the G1,G2 and G3 modes.
YES
NO
Ask the sender to change:
• Send manually with the "✱" button.
Increase the "593: Time between CED & 300 bps" to some value.
Error code No. 68 (Echo)?
NO
YES
Decrease the "596:Transmit level set" from -10 dBm to -12 dBm or some value.
Change the "718:Receive speed select" to 12,000, 9600, 7200, 4800 or 2400 bps.
Ask the sender to change:
• Increase the TX level.
• Change the TX equalizer.

Note:
"596: Transmit level set" represents a service code. (Refer to Service Function Table().)

Remarks:
Regarding the reception problem, we have investigated the conceivable causes in the flow chart except for the software-related errors. However, some troubles may occur due to the software-related problems such as "OUT OF PAPER" when the fax switches to the memory receiving mode and the memory capacity becomes full of the unprintable data. In this case, error messages [MEMORY FULL] and its main cause, for example "CHECK PAPER" are displayed on the LCD. Once you solve the main problem, [MEMORY FULL] will be cancelled and the reception problem will be resolved.
LCD display messages indicating the error causes are shown below.
CHECK PAPER
COVER OPEN
UNIT OVERHEATED (COVER OPEN, etc.)...Reset the unit.
PAPER JAMMED
CHECK FILM

Please refer to USER RECOVERABLE ERRORS () for the above items. If it turns out to be a hardware deformity, please check each sensor. (Refer to TEST FUNCTIONS ().)

7.6.5.1.4. The Unit can copy, but cannot Transmit/Receive

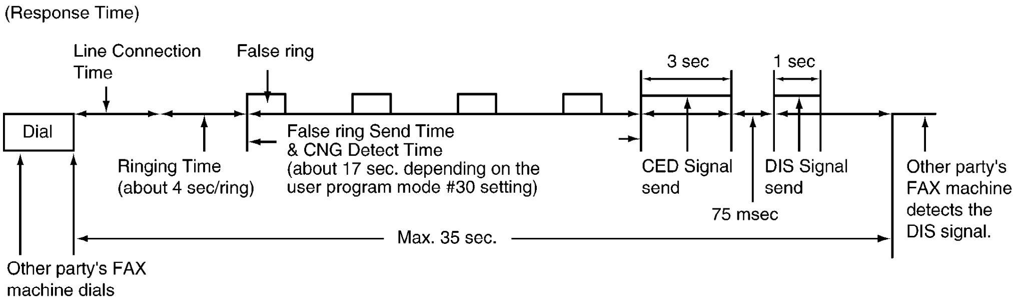

Without connecting the unit to a telephone line, perform a modem test (Refer to TEST FUNCTIONS). Is a signal audible from the handset or monitor?
OK
NG
Connect a PBX and TEL line and go off-hook.
Is the signal at pin 69 of IC505 output?
YES
Check the trace between pin 69 of IC505 and the Tip-Ring.
NO
Is the dial tone signal input at pin 60 of IC505?
NO
YES
Check the solder at pin 61 (XMDMCS) of IC501(ASIC).
Check the trace between T101 and pin 60 of IC505. (See Analog Board Section.)
Replace IC505. (MODEM)
OK
Replace IC505.

CROSS REFERENCE:
Analog Board Section()
TEST FUNCTIONS()

7.6.5.1.5. The unit can copy, but cannot either transmit/receive long distance or international communications

The following two causes can be considered for this symptom.

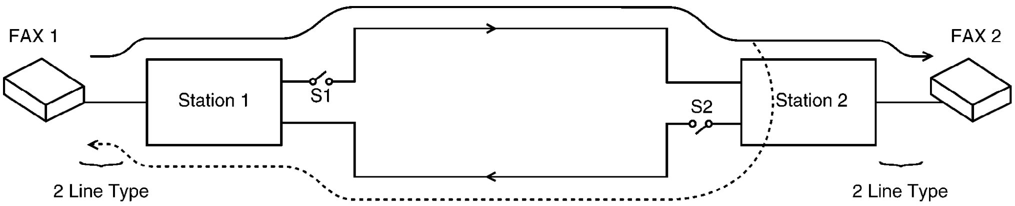
Cause 1:
The other party is executing automatic dialing, the call has been received by this unit, and the CED or DIS signal response time is too long. (In most cases, this unit detects the CNG signal and can respond to CED or DIS.) (According to the ITU-T standard, the communication procedure is cancelled when there is no response from the other party within 35 sec, so that the other party releases the line.)


(Response Time)
Line Connection Time
False ring
3 sec
1 sec
Dial
False ring Send Time & CNG Detect Time (about 17 sec. depending on the user program mode #30 setting)
Ringing Time (about 4 sec/ring)
CED Signal send
DIS Signal send
75 msec
Other party's FAX machine detects the DIS signal.
Max. 35 sec.
Other party's FAX machine dials

(Cause and Countermeasure)

As shown in the chart above, the total handshaking time must be reduced, but because of the long distance connection and linking of several stations, the line connection time cannot be reduced. Accordingly, the following countermeasures should be tried.
(A)... As the 35 sec. count is started directly after dialing or directly after the START button has been pressed for models with a START button, the other party should be called manually, if possible. Another possibility is entering two pauses at the end of the auto dial number on the transmission side. Then the count start time can be delayed for 2 pauses (about 10 sec.).

Cause 2:
Erroneous detection because of an echo or an echo canceler.


FAX 1
FAX 2
Station 1
Station 2
S1
S2
2 Line Type
2 Line Type

(Echo/Echo Canceler)

The signal from FAX1 reaches FAX2 via stations 1 and 2, but the reflection signal at station 2 also returns via station 1 (echo). As the distance between station 1 and station 2 is far, the echo returns to FAX 1 at a max of 600 msec after transmission. There is a possibility that this signal is detected erroneously as the signal from FAX2. For a normal call, there is also a possibility that the echo of their own voice will make the call difficult to understand. For this reason, each station (station 1 and station 2) attaches echo cancelers (S1 and S2) for international lines or long distance lines. For the echo canceler, the level of the transmission signal from FAX 1 is compared with the level of the reception signal from FAX2. When the transmission signal is larger, S1 is closed while S2 is opened when it is smaller. In other words, for transmission from FAX1, S1 is closed and S2 is open, so that the echo does not return to FAX1.

(Causes and Countermeasures)

No.	Countermeasure Side	Echo Communication Problem Example	Countermeasure	Service
1	Sending side	Some time is needed to compare the level of the receiving and sending signals for the echo canceler. The header of the training signal lacks due to a switching delay to close S1.	Add a dummy signal to the beginning of the training signal.	Service co (Internatio sele This counte becomes th valu
2	Receiving side	The echo canceler function stops according to a CED signal frequency of 2100Hz (S1 and S2 are both ON), a DIS signal is returned as an echo, and a DCS signal from the sending side overlaps the DIS echo. Then the receiving side FAX cannot retrieve the DCS signal. (Refer to Fig. a)	Change to a 1100Hz CED signal frequency. (Refer to Fig. b)	Service co (CED fre sele
	Receiving side		Change the regular rime of 75 msec between the CED signal and DIS signal to 500 msec. This will give at least 250 msec to recover the echo canceler operation. (Refer to Fig. c)	Service co (Time betw and 30
	Sending side		The sending side FAX sends a DCS signal not after receiving the 1st DIS signal but after receiving the 2nd DIS signal. (Refer to Fig. d)	Service co (Overse detection
3	Sending side	Communication failure occurs in a long distance communication on the telephone line without an echo canceler. or There are some cases (e.g. Mobil comms.) which cause the collision of TX / RX signals due to the delay / echo and noise of the network / terminal. (Refer to Fig. e)	Decrease the transmission level from -10 dBm to -15 dBm and the echo level will decrease.	Service co (Transmit
4	Sending side Receiving side		Decrease the receiving sensitivity from -13 dBm to about -32 dBm so an echo signal will not received.	Service co (Receiving
5	Sending side Receiving side		Set additional Pause time (Service mode: code No. 774) in between the original and its repeated signals, to prevent the collision of the signals at both end.	Service co (T4 ti

Fig. a (Overlapping the Echo of the DIS signal and DCS signal)

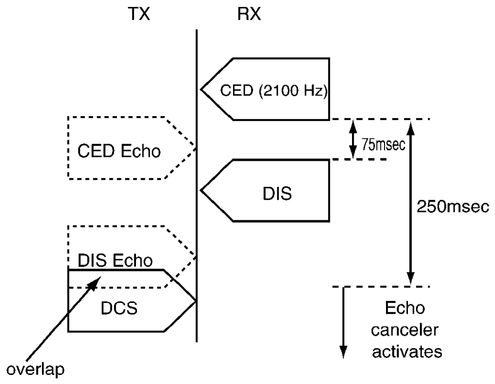

TX
RX
CED (2100 Hz)
CED Echo
75msec
DIS
250msec
DIS Echo
DCS
overlap
Echo
canceler
activates

Fig. b (Countermeasure by Changing the CED Frequency)

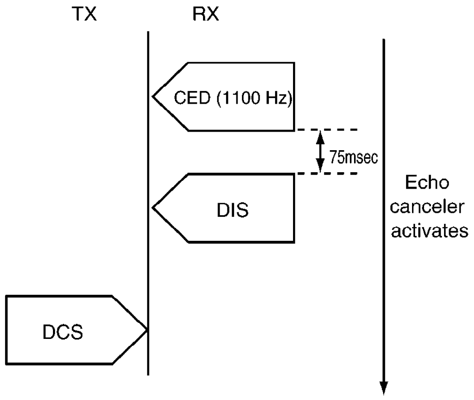

TX
RX
CED (1100 Hz)
75msec
DIS
Echo
canceler
activates
DCS

Fig. c (Countermeasure by Changing the Interval Between CED and DIS)

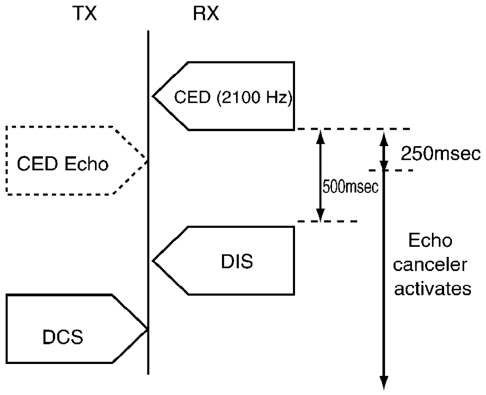
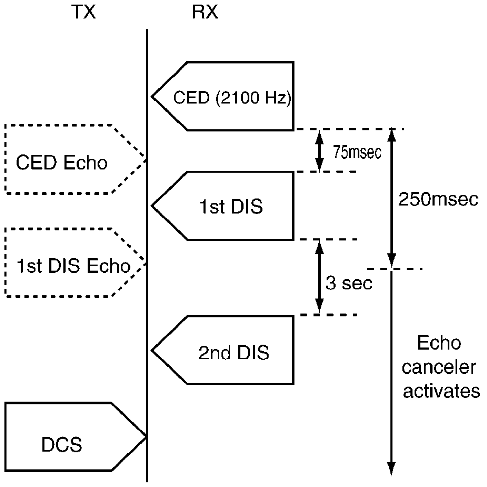
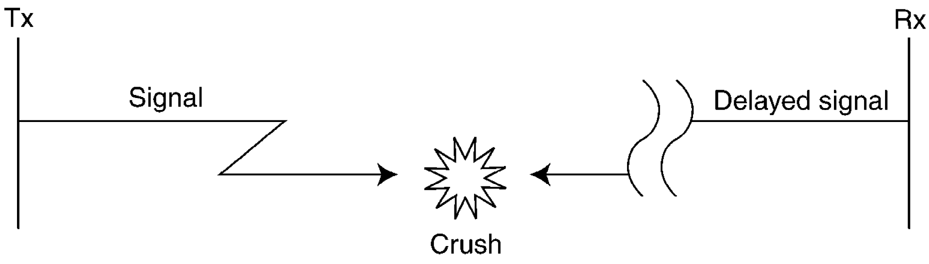

TX
RX
CED (2100 Hz)
CED Echo
250msec
500msec
DIS
Echo
canceler
activates
DCS

Fig. d (C3ountemeasure by Ignoring the 1st DIS)


TX
RX
CED (2100 Hz)
CED Echo
75msec
250msec
1st DIS
1st DIS Echo
3 sec
2nd DIS
Echo canceler activates
DCS

<TX side signal>	<RX side signal>	<Countermeasure>
2nd / 3rd DCS / Training	& delayed CFR / FTT	at TX side
2nd / 3rd EOP / EOM / MPS	& delayed MCF / PIP / PIN / RTP / RTN	at TX side
delayed DCS	& 2nd / 3rd / --- DIS	at RX side

(Fig. e)


Tx
Rx
Signal
Delayed signal
Crush

7.6.5.1.6. The unit can copy, but the transmission and reception image are incorrect (Long distance or international communication operation)

This symptom highly depends on the transmission and reception capability of the other FAX unit and the line conditions.
The countermeasures for this unit are shown below.

Transmission Operation:
Set the transmitting speed to 4800BPS (service mode: code No. 717) or select the overseas mode.

Reception Operation:
If 80% or more of the reception is incorrect, set the receiving speed to 4800BPS. (Service mode: code No. 718)

- Refer to Service Function Table().

7.6.5.1.7. How To Record Fax Signal by using PC

Recording FAX signal is one of the useful analysis measures to solve communication problems. The way of recording easily by using PC is shown as follows.

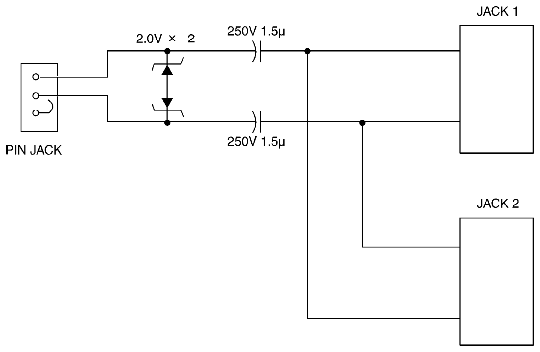
1. Equipment

- **1 jig**
- **1 PC (with LINE IN)**
- **1 audio cord (mini jack supported)**
- **2 tel cords**

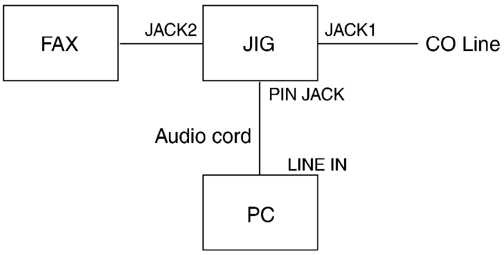
Parts No.	Parts Name & Description	Qt'y
PQJJ1T004Z	JACK1, JACK2	2
PQJJ1D010Z	PIN JACK	1
ECQE2155KF or ECQE2E155KC	CAPACITOR	2
MA4020	DIODE	2

2. Setting up

FAX SIGNAL RECORDING JIG



3. Connecting PC and JIG


FAX
JACK2
JIG
JACK1
CO Line
PIN JACK
Audio cord
LINE IN
PC

4. PC setting and recording

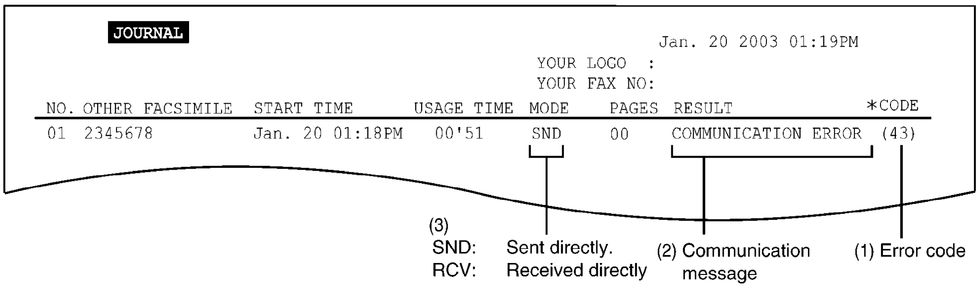
1. **Set LINE IN to be valid in the volume control setting. Refer to the PC instruction book.**
2. **Start up the PC software “ SOUND RECORDER”. (This software is bundled to Windows OS, which can create WAV file.) Set the audio format “ PCM 22.050kHz, 8bit, mono”.**
3. **Click the record button and start recording after acquisition the signal.**

Note:

- **Not to be wind wave patterns on the wave monitor.**
- **Please compress the recording data when you send attaching to E-Mail because the data size will be so heavy.**
- **Any software which can create WAV files is available.**

7.6.5.1.8. How to Output the Journal Report

1. **Press [MENU] three times.**
2. **Press [◀] or [▶] until the “ JOURNAL REPORT ” is displayed.**
3. **Press [SET] .**
4. **The report is printed out.**



```
        JOURNAL
                                                        Jan. 20 2003 01:19PM
                                             YOUR LOGO  :
                                             YOUR FAX NO:
NO. OTHER FACSIMILE  START TIME      USAGE TIME  MODE    PAGES  RESULT            *CODE
01  2345678          Jan. 20 01:18PM    00'51     SND     00    COMMUNICATION ERROR  (43)
```

(3)
SND: Sent directly.
RCV: Received directly
(2) Communication message
(1) Error code

Error code table:

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM
	PRESSED THE STOP KEY	SND & RCV	Communication was interrupted by the STOP button.
	DOCUMENT JAMMED	SND	The document paper is jammed.
	NO DOCUMENT	SND	No document paper.
	THE COVER WAS OPENED	SND & RCV	The cover is open.
	OTHER FAX NOT RESONDING	SND	Transmission is finished when the T1 TIMER expires.
28	COMMUNICATION ERROR	SND & RCV	
41	COMMUNICATION ERROR	SND	DCN is received after DCS transmission.
42	COMMUNICATION ERROR	SND	FTT is received after transmission of a 2400BPS training signal.
43	COMMUNICATION ERROR	SND	No response after post message is transmitted three times.
44	COMMUNICATION ERROR	SND	RTN and PIN are received.
46	COMMUNICATION ERROR	RCV	No response after FTT is transmitted.
48	COMMUNICATION ERROR	RCV	No post message.
49	COMMUNICATION ERROR	RCV	RTN is transmitted.
50	COMMUNICATION ERROR	RCV	PIN is transmitted (to PRI-Q).
51	COMMUNICATION ERROR	RCV	PIN is transmitted.
	OTHER FAX NOT RESONDING	RCV	Reception is finished when the T1 TIMER expires.
54	ERROR-NOT YOUR UNIT	RCV	DCN is received after DIS transmission.
58	COMMUNICATION ERROR	RCV	DCN is received after FTT transmission.
59	ERROR-NOT YOUR UNIT	SND	DCN responds to the post message.
65	COMMUNICATION ERROR	SND	DCN is received before DIS reception.
65	COMMUNICATION ERROR	RCV	Reception is not EOP, EOM PIP, PIN, RTP or RTN.
68	COMMUNICATION ERROR	RCV	No response at the other party after MCF or CFR i transmitted.
70	ERROR-NOT YOUR UNIT	RCV	DCN is received after CFR transmission.
72	COMMUNICATION ERROR	RCV	Carrier is cut when the image signal is received.
	MEMORY FULL	RCV	The document was not received due to memory full.
	CANCELED	SND	The multi-station transmission was rejected by th user.
FF	COMMUNICATION ERROR	SND & RCV	Modem error. For the DCN, DCN, etc. abbreviations, refer to MODEM SECTION ().

SND=TRANSMISSION RCV=RECEPTION
Most fax communication problems can be resolved by the following steps.

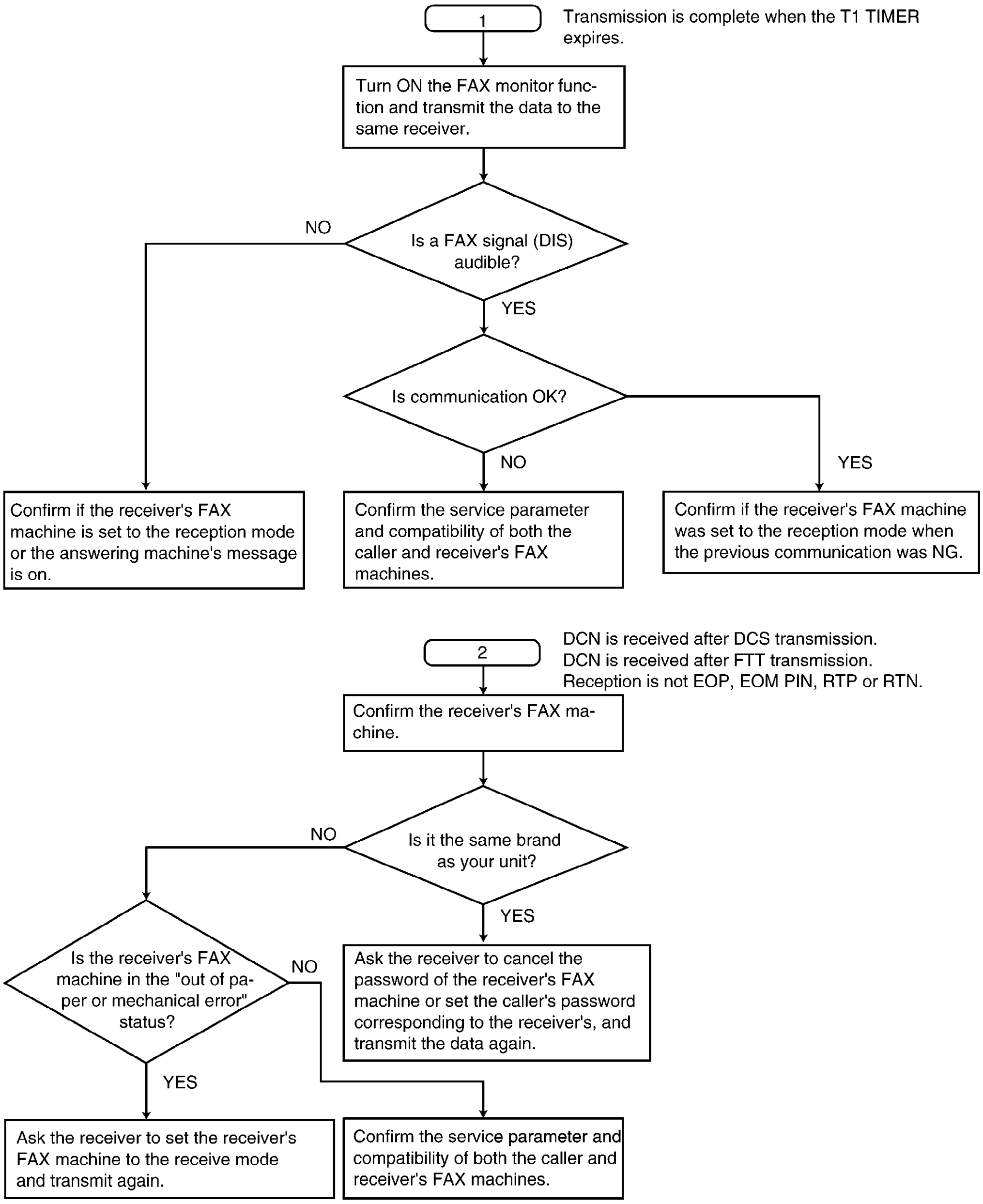
1. Change the transmit level. (Service code: 596, refer to Service

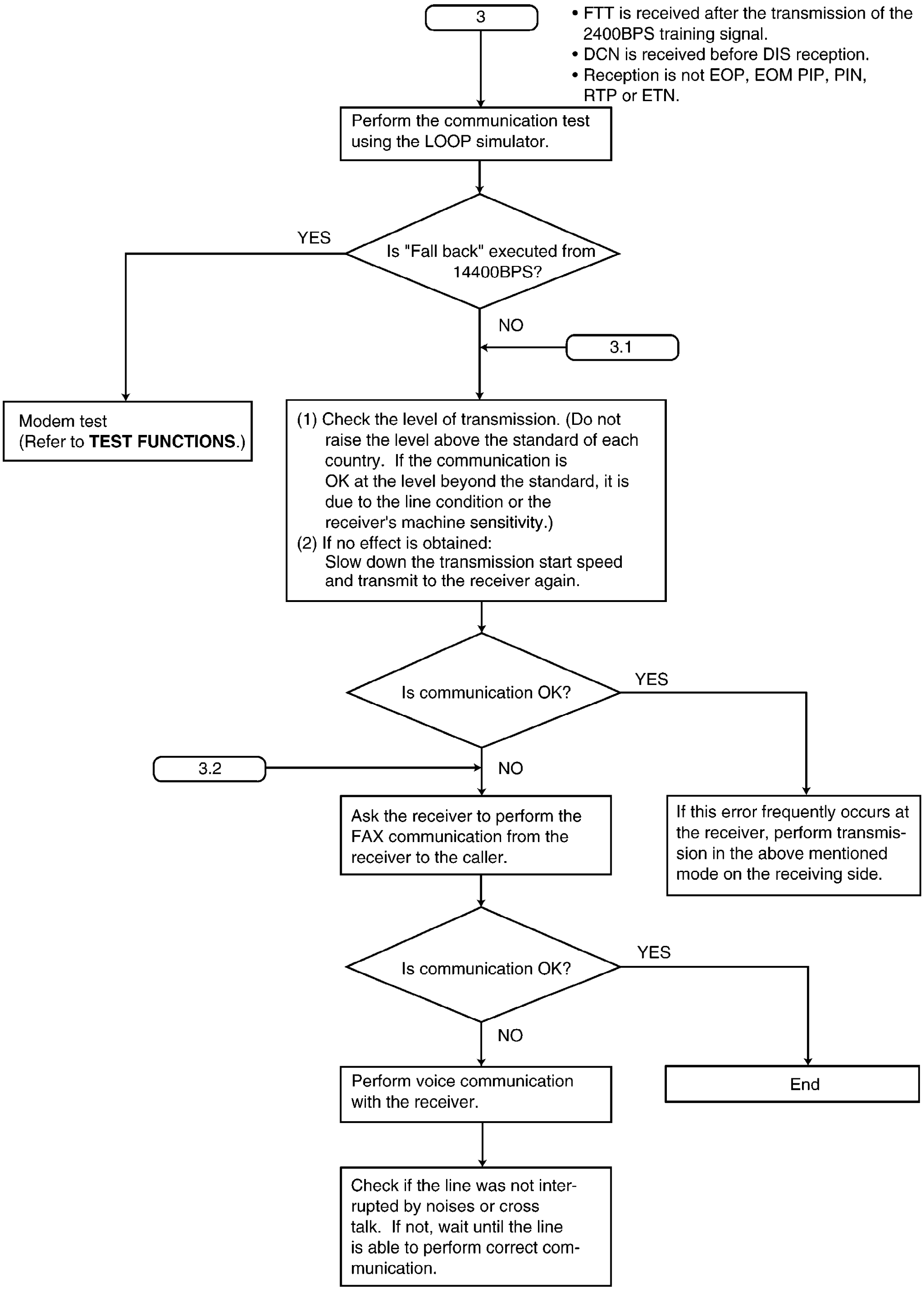
Function Table().)

2. Change the TX speed/RX speed. (Service code: 717/718, refer to Service Function Table ().)

Note*:
If the problem remains, see the following "Countermeasure" flow chart.

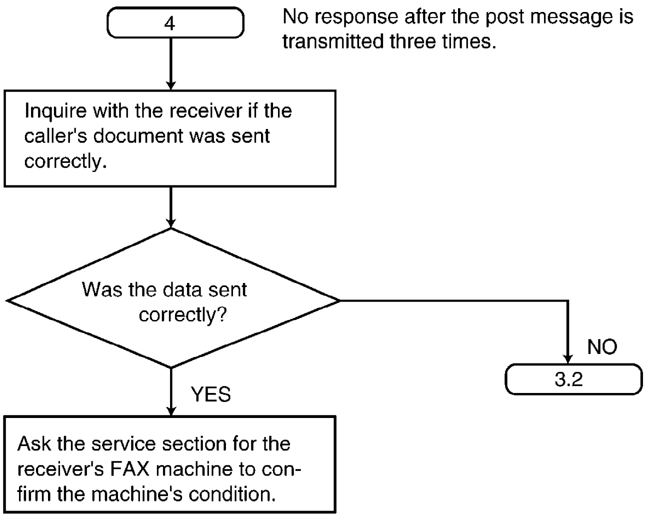
Countermeasure

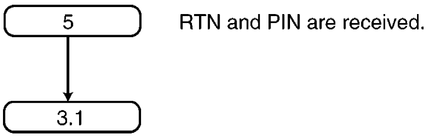

1
Transmission is complete when the T1 TIMER expires.
Turn ON the FAX monitor function and transmit the data to the same receiver.
Is a FAX signal (DIS) audible?
NO
YES
Is communication OK?
NO
YES
Confirm if the receiver's FAX machine is set to the reception mode or the answering machine's message is on.
Confirm the service parameter and compatibility of both the caller and receiver's FAX machines.
Confirm if the receiver's FAX machine was set to the reception mode when the previous communication was NG.
2
DCN is received after DCS transmission.
DCN is received after FTT transmission.
Reception is not EOP, EOM PIN, RTP or RTN.
Confirm the receiver's FAX machine.
Is it the same brand as your unit?
NO
YES
Is the receiver's FAX machine in the "out of paper or mechanical error" status?
NO
YES
Ask the receiver to cancel the password of the receiver's FAX machine or set the caller's password corresponding to the receiver's, and transmit the data again.
Ask the receiver to set the receiver's FAX machine to the receive mode and transmit again.
Confirm the service parameter and compatibility of both the caller and receiver's FAX machines.

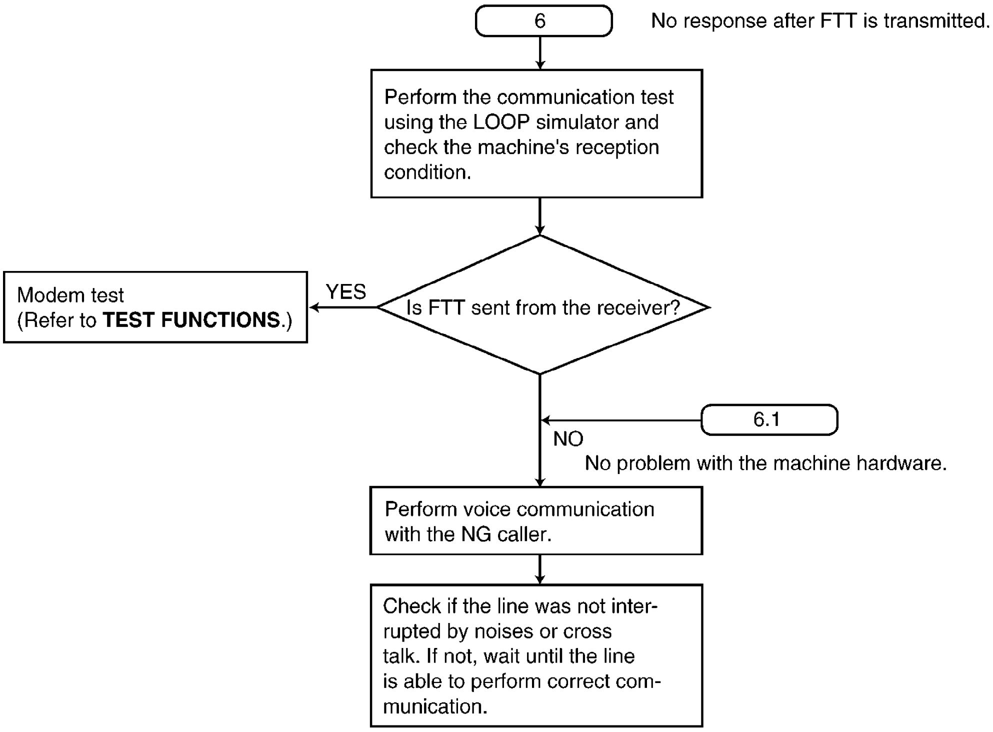

3
• FTT is received after the transmission of the 2400BPS training signal.
• DCN is received before DIS reception.
• Reception is not EOP, EOM PIP, PIN, RTP or ETN.
Perform the communication test using the LOOP simulator.
Is "Fall back" executed from 14400BPS?
YES
NO
3.1
Modem test (Refer to TEST FUNCTIONS.)
(1) Check the level of transmission. (Do not raise the level above the standard of each country. If the communication is OK at the level beyond the standard, it is due to the line condition or the receiver's machine sensitivity.)
(2) If no effect is obtained: Slow down the transmission start speed and transmit to the receiver again.
Is communication OK?
YES
NO
3.2
Ask the receiver to perform the FAX communication from the receiver to the caller.
If this error frequently occurs at the receiver, perform transmission in the above mentioned mode on the receiving side.
Is communication OK?
YES
NO
Perform voice communication with the receiver.
End
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.

CROSS REFERENCE:

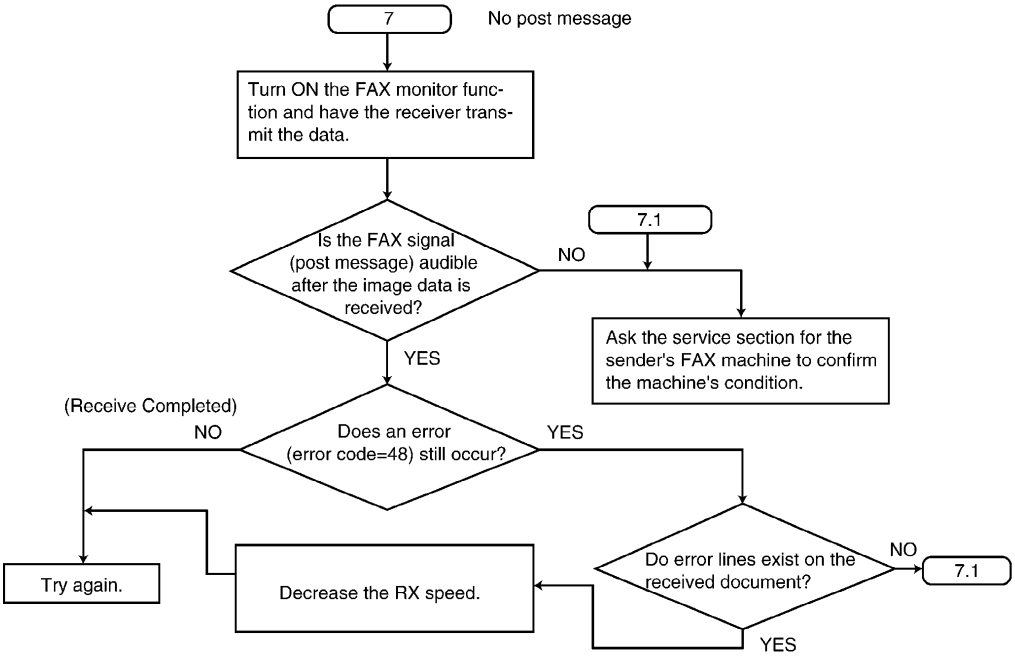
TEST FUNCTIONS()

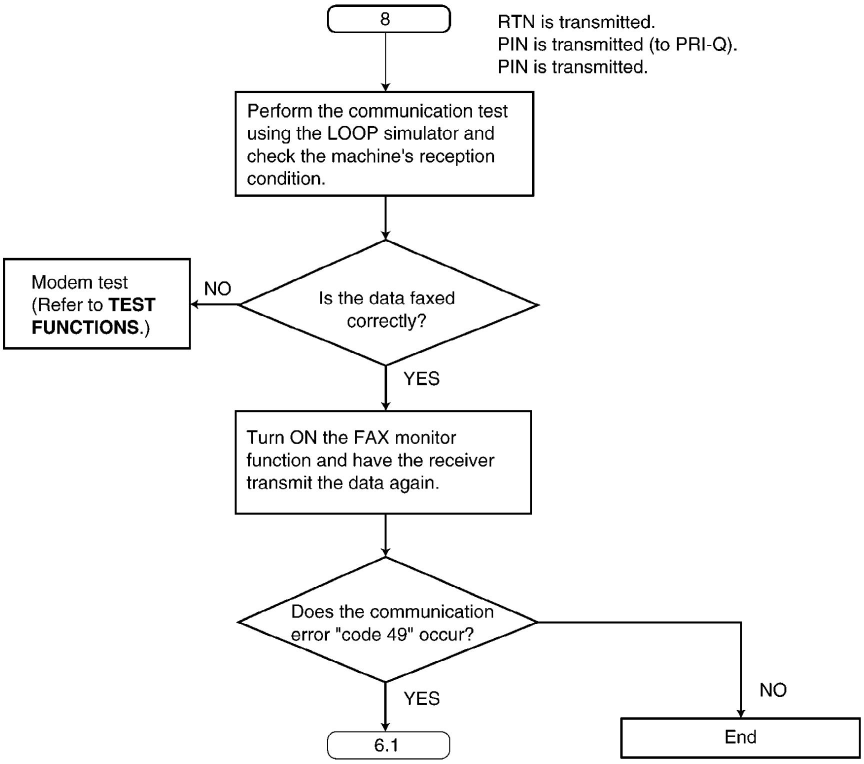

4
No response after the post message is transmitted three times.
Inquire with the receiver if the caller's document was sent correctly.
Was the data sent correctly?
NO
3.2
YES
Ask the service section for the receiver's FAX machine to confirm the machine's condition.


5
RTN and PIN are received.
3.1


6
No response after FTT is transmitted.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Is FTT sent from the receiver?
YES
Modem test (Refer to **TEST FUNCTIONS**.)
NO
6.1
No problem with the machine hardware.
Perform voice communication with the NG caller.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.

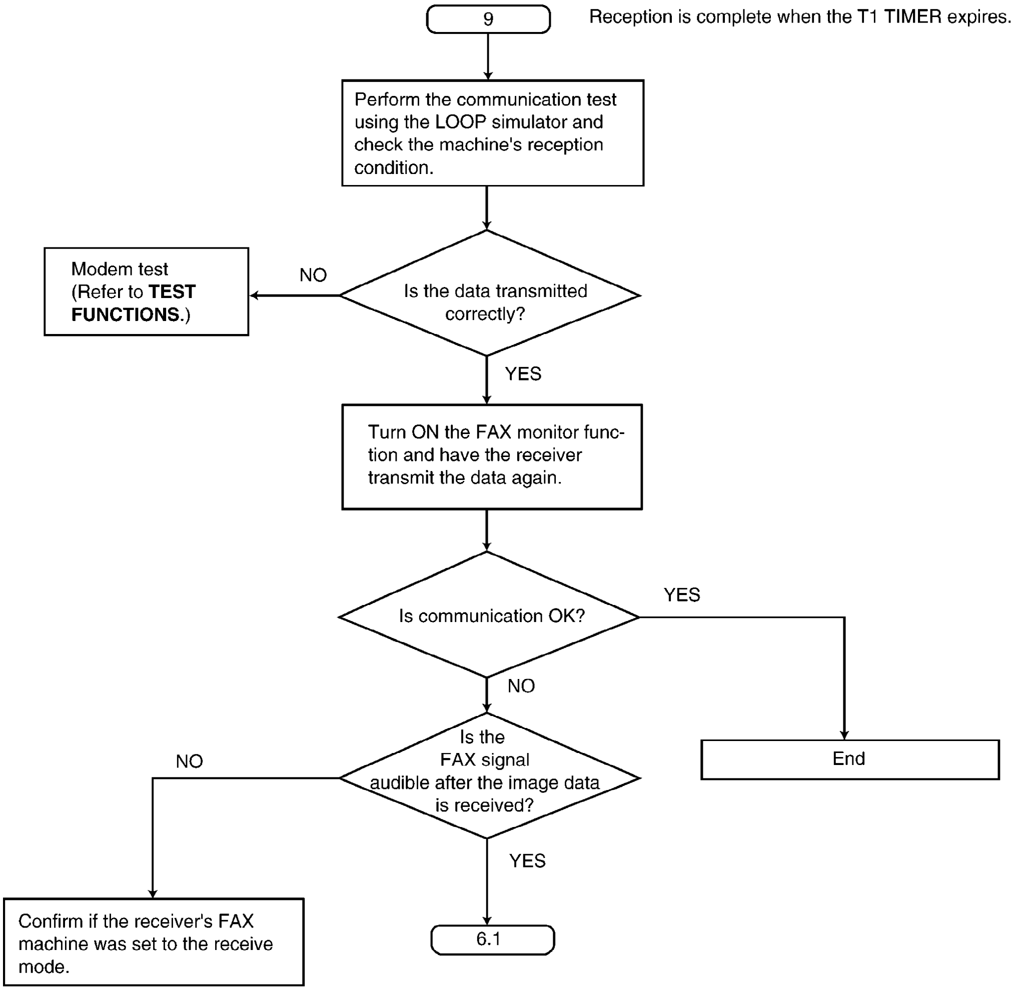
CROSS REFERENCE:
TEST FUNCTIONS**()**


7
No post message
Turn ON the FAX monitor function and have the receiver transmit the data.
Is the FAX signal (post message) audible after the image data is received?
NO
7.1
Ask the service section for the sender's FAX machine to confirm the machine's condition.
YES
(Receive Completed)
NO
Does an error (error code=48) still occur?
YES
Do error lines exist on the received document?
NO
7.1
YES
Decrease the RX speed.
Try again.


8
RTN is transmitted.
PIN is transmitted (to PRI-Q).
PIN is transmitted.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Is the data faxed correctly?
NO
Modem test (Refer to TEST FUNCTIONS.)
YES
Turn ON the FAX monitor function and have the receiver transmit the data again.
Does the communication error "code 49" occur?
YES
6.1
NO
End

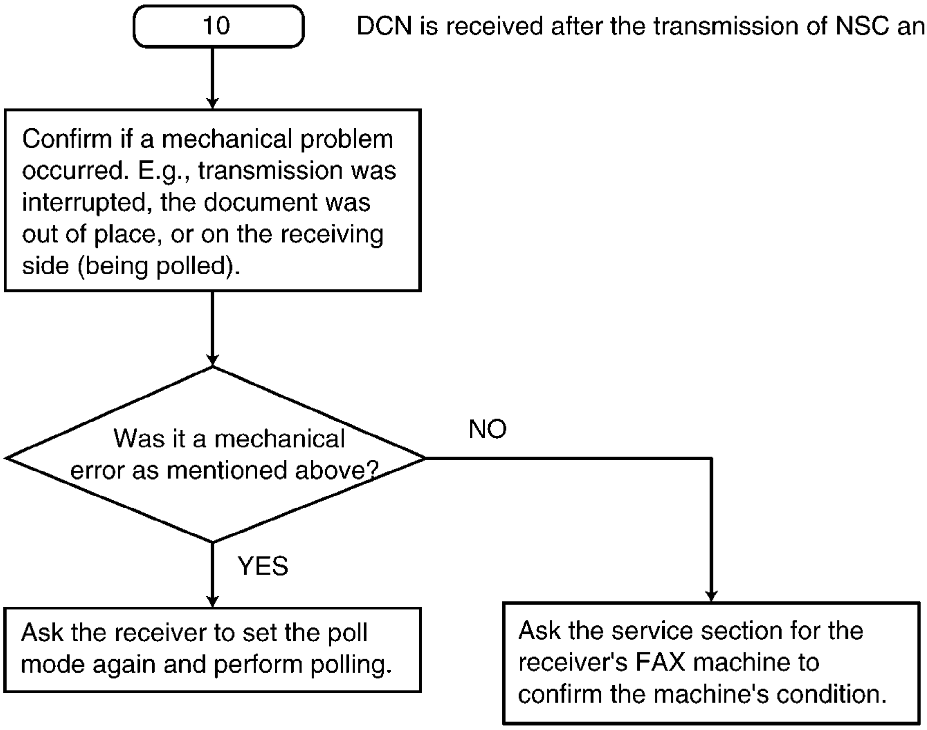
CROSS REFERENCE:

TEST FUNCTIONS()

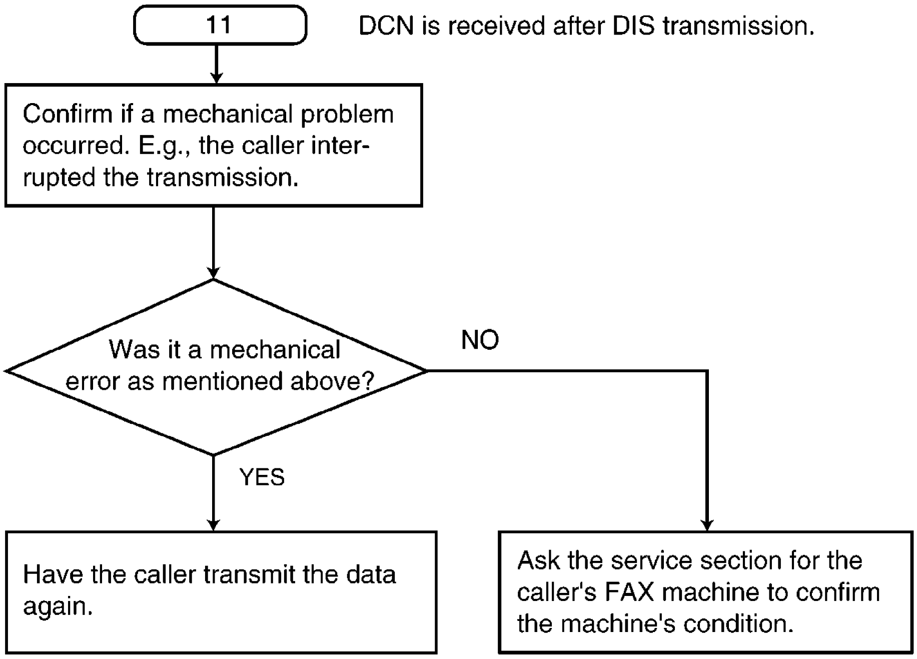

9
Reception is complete when the T1 TIMER expires.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Is the data transmitted correctly?
NO
Modem test (Refer to **TEST FUNCTIONS**.)
YES
Turn ON the FAX monitor function and have the receiver transmit the data again.
Is communication OK?
YES
End
NO
Is the FAX signal audible after the image data is received?
NO
Confirm if the receiver's FAX machine was set to the receive mode.
YES
6.1

CROSS REFERENCE:

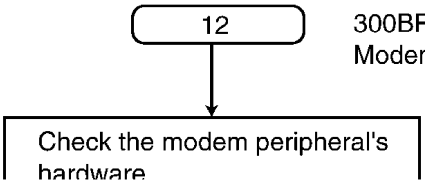
TEST FUNCTIONS()


DCN is received after the transmission of NSC and DTC.

10
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.

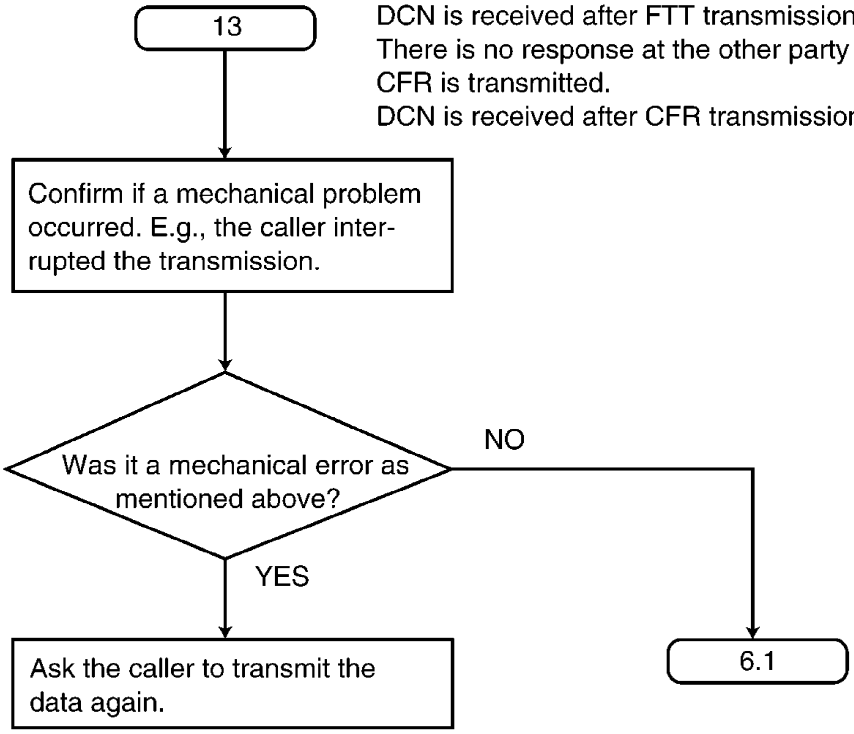

DCN is received after DIS transmission.

11
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Have the caller transmit the data again.
Ask the service section for the caller's FAX machine to confirm the machine's condition.

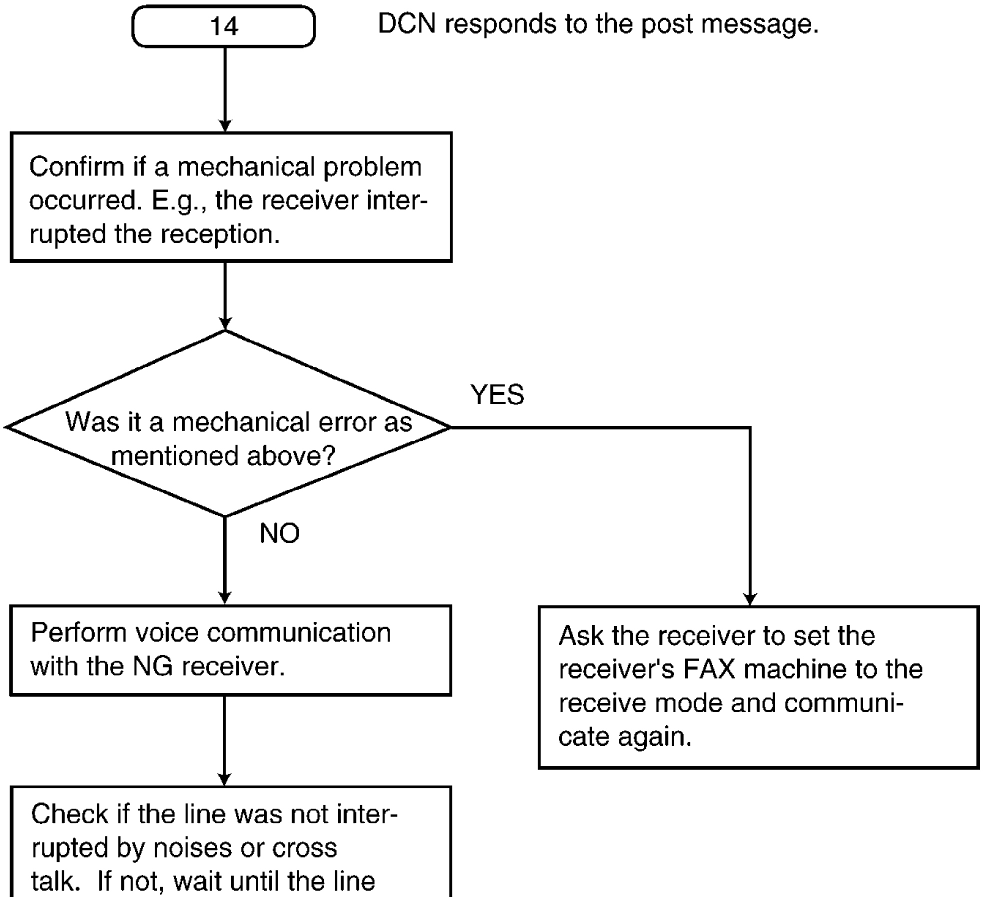

300BPS error
Modem error

12
Check the modem peripheral's hardware

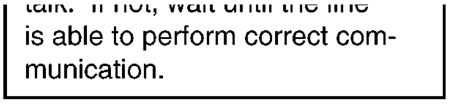
hardware.

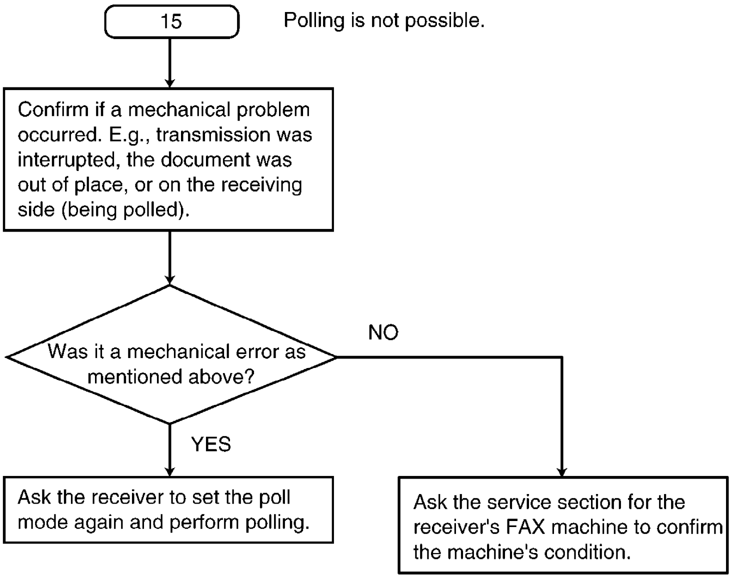

13
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Ask the caller to transmit the data again.
6.1

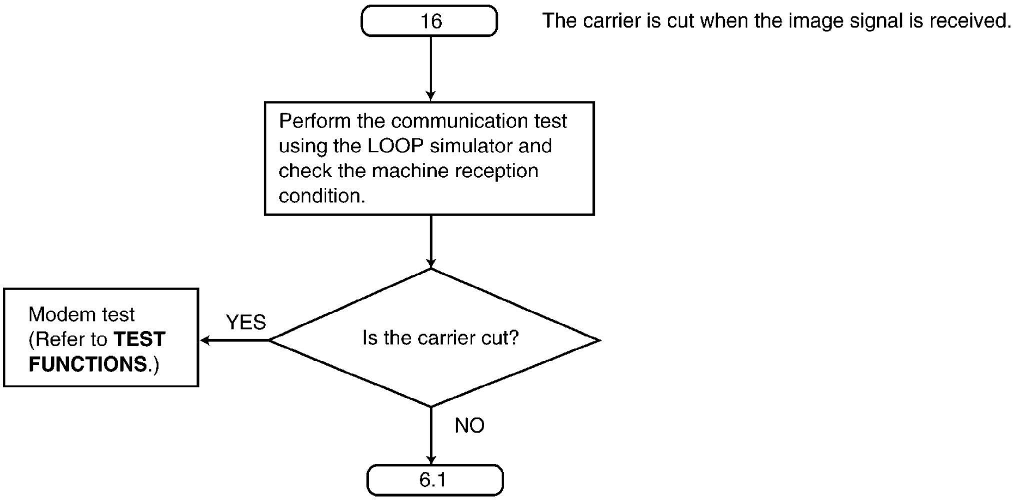
DCN is received after FTT transmission.
There is no response at the other party after MCF or CFR is transmitted.
DCN is received after CFR transmission.


14
Confirm if a mechanical problem occurred. E.g., the receiver interrupted the reception.
Was it a mechanical error as mentioned above?
YES
NO
Perform voice communication with the NG receiver.
Ask the receiver to set the receiver's FAX machine to the receive mode and communicate again.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line

DCN responds to the post message.


is able to perform correct com-
munication.


15
Polling is not possible.
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.

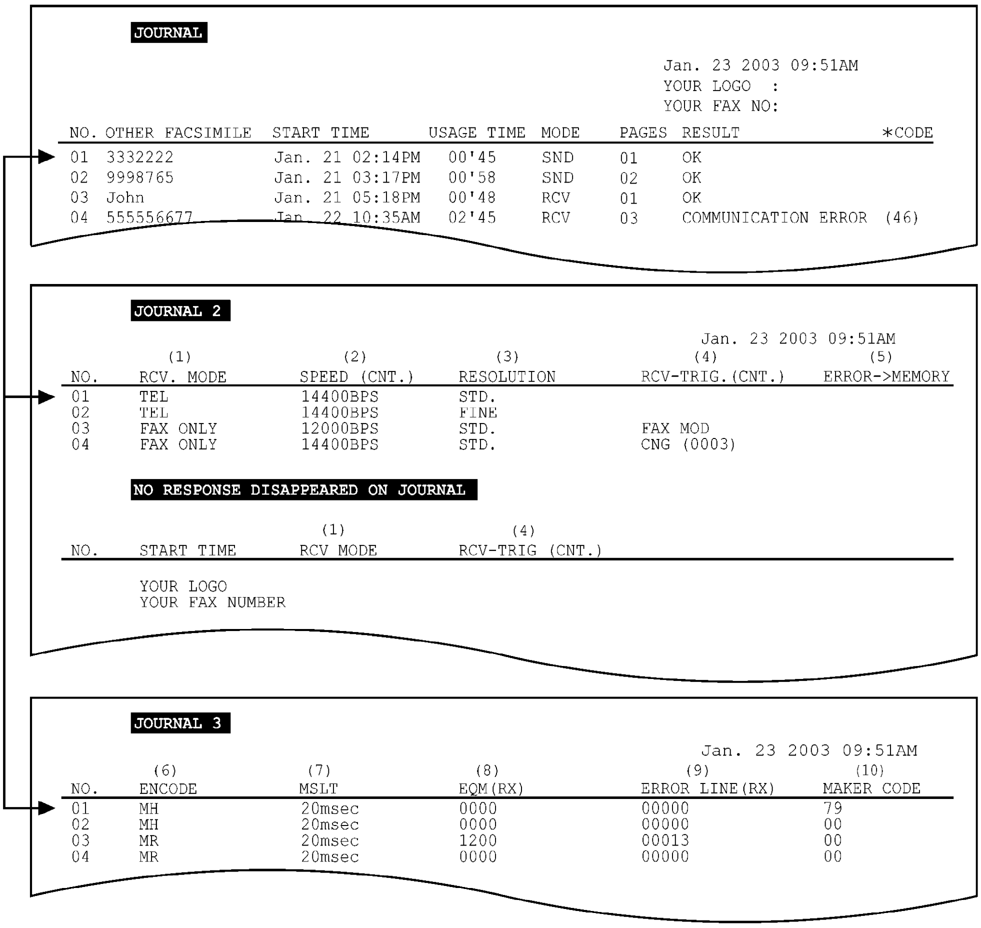

16
The carrier is cut when the image signal is received.
Perform the communication test using the LOOP simulator and check the machine reception condition.
Is the carrier cut?
YES
Modem test (Refer to TEST FUNCTIONS.)
NO
6.1

CROSS REFERENCE:
TEST FUNCTIONS()

7.6.5.2. Special Service Journal Reports

Journal 2 and Journal 3 shown below, which are special journals giving the additional detailed information about the latest 35 communications, can be printed by Service Code 881 or 882. Remote printing function for the journal reports (JOURNAL, JOURNAL 2 and JOURNAL 3) is also available for service technicians. (Refer to REMOTE PROGRAMMING().) The JOURNAL report only gives you basic information about a communication, but the other two journal

reports provide different information on the same item (communication).



```
JOURNAL

                                              Jan. 23 2003 09:51AM
                                              YOUR LOGO  :
                                              YOUR FAX NO:
NO. OTHER FACSIMILE  START TIME       USAGE TIME  MODE    PAGES  RESULT                 *CODE
01  3332222          Jan. 21 02:14PM    00'45     SND      01     OK
02  9998765          Jan. 21 03:17PM    00'58     SND      02     OK
03  John             Jan. 21 05:18PM    00'48     RCV      01     OK
04  555556677        Jan. 22 10:35AM    02'45     RCV      03     COMMUNICATION ERROR  (46)
```

```
JOURNAL 2

                                                          Jan. 23 2003 09:51AM
        (1)              (2)              (3)                (4)               (5)
NO.     RCV. MODE        SPEED (CNT.)     RESOLUTION         RCV-TRIG.(CNT.)   ERROR->MEMORY
01      TEL              14400BPS         STD.
02      TEL              14400BPS         FINE
03      FAX ONLY         12000BPS         STD.               FAX MOD
04      FAX ONLY         14400BPS         STD.               CNG (0003)

        NO RESPONSE DISAPPEARED ON JOURNAL

                         (1)                 (4)
NO.     START TIME       RCV MODE         RCV-TRIG (CNT.)

        YOUR LOGO
        YOUR FAX NUMBER
```

```
JOURNAL 3

                                                          Jan. 23 2003 09:51AM
       (6)               (7)              (8)                (9)               (10)
NO.     ENCODE           MSLT             EQM(RX)            ERROR LINE(RX)    MAKER CODE
01      MH               20msec           0000               00000             79
02      MH               20msec           0000               00000             00
03      MR               20msec           1200               00013             00
04      MR               20msec           0000               00000             00
```

HOW TO READ JOURNAL REPORTS:

Example:

1. **Look at NO. 01 in the JOURNAL. If you want to know about the details about that item, see NO. 01 in the JOURNAL 2 and the JOURNAL 3. You can get the following information.**
   *** MODE: Fax transmission**
   *** RCV. MODE: TEL**
   *** TX SPEED: 9.6 kbps**
   *** RESOLUTION: standard**
   *** ENCODE: MH**
   *** MAKER CODE: 79**
2. **Look at NO. 04 in the JOURNAL 2. CNG (0003) indicates that the CNG signal has been received three times since the purchase date.**

For further details, see Journal 2() and Journal 3().

7.6.5.2.1. Journal 2

Refer to JOURNAL 2 in Printout Example().

Journal 2 displays the additional detailed information about the last 35 communications.

Descriptions:

(1) RCV. MODE

Indicates which receive mode the unit was in when the unit received a fax message.
This information is also displayed when the unit transmitted a fax message.

(2) SPEED

Indicates the speed of the communication. If multiple pages are transmitted or received, it indicates the last page’s communication speed. If there is a communication error, "?" is displayed.

(3) RESOLUTION

Indicates the resolution of the communication. If multiple pages are transmitted or received, it indicates the last page’s resolution. If there is a communication error, "?" is displayed.

(4) RCV-TRIG. (CNT.)

Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in JOURNAL 2 in Printout Example(). The values in parentheses indicate how many times the trigger has been used. (For example, "0003" means three times.)

No.	Display	Function
1	FAX MODE	Means the unit received a fax message in the FAX mode.
2	MAN RCV	Means the unit received a fax message by manual operation.
3	FRN RCV	Means the unit received a fax message by friendly signal detection.
4	VOX	Means the unit detected silence or no voice.
5	RMT DTMF	Means the unit detected DTMF (Remote Fax activation code) entered remotely.
6	PAL DTMF	Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
7	TURN-ON	Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)
8	TIME OUT	Means the unit started to receive after Ring Time Out.
9	IDENT	Means the unit detected Ring Detection.
10	CNG OGM	Means the unit detected the CNG while it was sending the OGM in the TAM/FAX mode.
11	CNG ICM	Means the unit detected the CNG while it was recording the ICM in the TAM /FAX mode.

(5) ERROR → MEMORY

Indicates the reason why the unit received a fax message in memory.
If you look at No.11 in the JOURNAL 2 in Printout Example(), it shows the fax message was received in memory due to "PAPER OUT" error.

[NO RESPONSE DISAPPEARED ON JOURNAL]

The "NO RESPONSE DISAPPEARED ON JOURNAL" displays the information about the last 10 communications terminated by "No Response". (Some of the communications terminated by "No Response" were not displayed in the JOURNAL.)
When a fax transmission cannot be performed because the other party’s unit is set to the TEL

mode, "No response" will be printed.

7.6.5.2.2. Journal 3

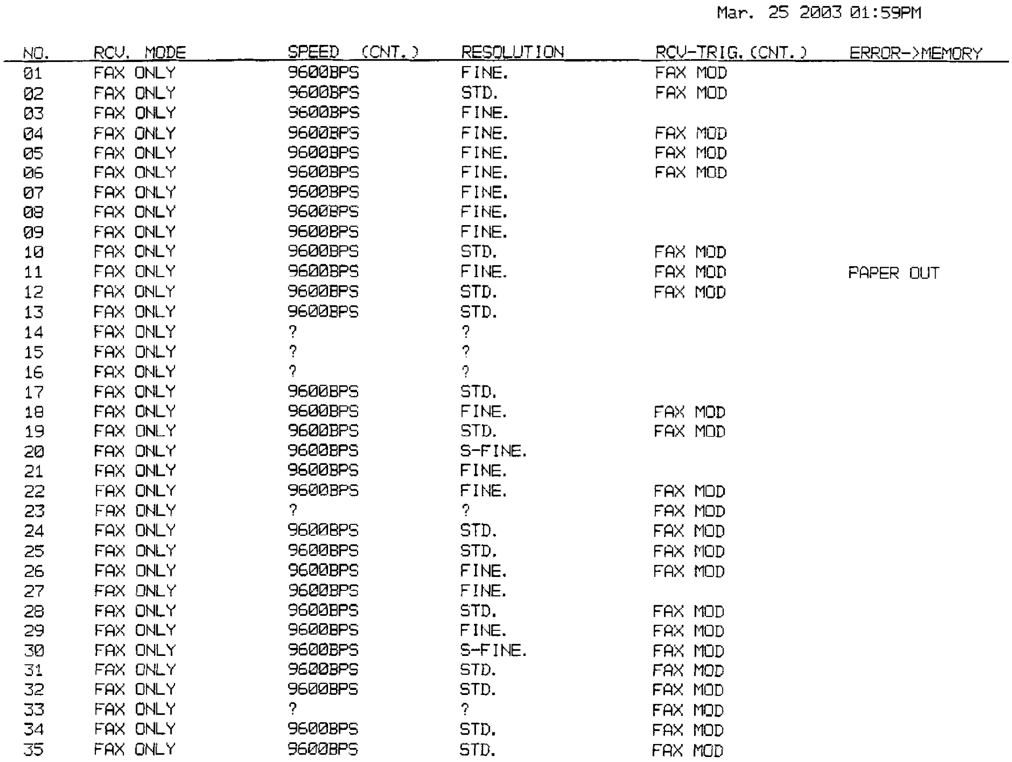
Refer to JOURNAL 3 in Printout Example ().

Descriptions:

(6) ENCODE
Compression Code: MH/MR
(7) MSLT
MSLT means Minimum Scan Line Time. Used only at the factory.
(8) EQM
EQM means Eye Quality Monitor. Used only at the factory.
(9) ERROR LINE(RX)
When an error occurs while receiving a fax, this shows the number of error lines.
(10) MAKER CODE
This shows a 2 digit code of the other party's fax machine brand.
0E: "KX" model
00: Unknown
79: "UF" model
19: "Xerox" model

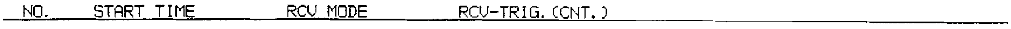
7.6.5.2.3. Printout Example

JOURNAL2



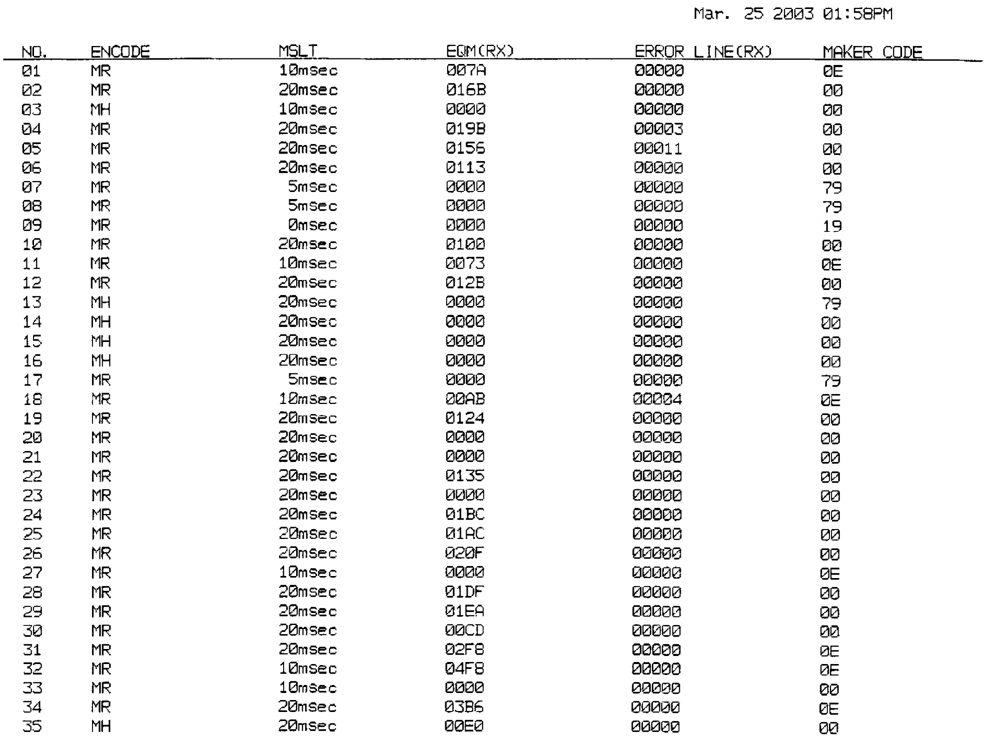
```
                                                        Mar. 25 2003 01:59PM

NO.   RCV. MODE        SPEED  (CNT.)   RESOLUTION      RCV-TRIG.(CNT.)   ERROR->MEMORY
01    FAX ONLY         9600BPS         FINE.           FAX MOD
02    FAX ONLY         9600BPS         STD.            FAX MOD
03    FAX ONLY         9600BPS         FINE.
04    FAX ONLY         9600BPS         FINE.           FAX MOD
05    FAX ONLY         9600BPS         FINE.           FAX MOD
06    FAX ONLY         9600BPS         FINE.           FAX MOD
07    FAX ONLY         9600BPS         FINE.
08    FAX ONLY         9600BPS         FINE.
09    FAX ONLY         9600BPS         FINE.
10    FAX ONLY         9600BPS         STD.            FAX MOD
11    FAX ONLY         9600BPS         FINE.           FAX MOD           PAPER OUT
12    FAX ONLY         9600BPS         STD.            FAX MOD
13    FAX ONLY         9600BPS         STD.
14    FAX ONLY         ?               ?
15    FAX ONLY         ?               ?
16    FAX ONLY         ?               ?
17    FAX ONLY         9600BPS         STD.
18    FAX ONLY         9600BPS         FINE.           FAX MOD
19    FAX ONLY         9600BPS         STD.            FAX MOD
20    FAX ONLY         9600BPS         S-FINE.
21    FAX ONLY         9600BPS         FINE.
22    FAX ONLY         9600BPS         FINE.           FAX MOD
23    FAX ONLY         ?               ?               FAX MOD
24    FAX ONLY         9600BPS         STD.            FAX MOD
25    FAX ONLY         9600BPS         STD.            FAX MOD
26    FAX ONLY         9600BPS         FINE.           FAX MOD
27    FAX ONLY         9600BPS         FINE.
28    FAX ONLY         9600BPS         STD.            FAX MOD
29    FAX ONLY         9600BPS         FINE.           FAX MOD
30    FAX ONLY         9600BPS         S-FINE.         FAX MOD
31    FAX ONLY         9600BPS         STD.            FAX MOD
32    FAX ONLY         9600BPS         STD.            FAX MOD
33    FAX ONLY         ?               ?               FAX MOD
34    FAX ONLY         9600BPS         STD.            FAX MOD
35    FAX ONLY         9600BPS         STD.            FAX MOD
```

NO RESPONSE DISAPPEARED ON JOURNAL



```
NO.   START TIME       RCV MODE        RCV-TRIG.(CNT.)
```

JOURNAL3



Mar. 25 2003 01:58PM

NO.	ENCODE	MSLT	EQM(RX)	ERROR LINE(RX)	MAKER CODE
01	MR	10msec	007A	00000	0E
02	MR	20msec	016B	00000	00
03	MH	10msec	0000	00000	00
04	MR	20msec	019B	00003	00
05	MR	20msec	0156	00011	00
06	MR	20msec	0113	00000	00
07	MR	5msec	0000	00000	79
08	MR	5msec	0000	00000	79
09	MR	0msec	0000	00000	19
10	MR	20msec	0100	00000	00
11	MR	10msec	0073	00000	0E
12	MR	20msec	012B	00000	00
13	MH	20msec	0000	00000	79
14	MH	20msec	0000	00000	00
15	MH	20msec	0000	00000	00
16	MH	20msec	0000	00000	00
17	MR	5msec	0000	00000	79
18	MR	10msec	00AB	00004	0E
19	MR	20msec	0124	00000	00
20	MR	20msec	0000	00000	00
21	MR	20msec	0000	00000	00
22	MR	20msec	0135	00000	00
23	MR	20msec	0000	00000	00
24	MR	20msec	01BC	00000	00
25	MR	20msec	01AC	00000	00
26	MR	20msec	020F	00000	00
27	MR	10msec	0000	00000	0E
28	MR	20msec	01DF	00000	00
29	MR	20msec	01EA	00000	00
30	MR	20msec	00CD	00000	00
31	MR	20msec	02F8	00000	0E
32	MR	10msec	04F8	00000	0E
33	MR	10msec	0000	00000	00
34	MR	20msec	03B6	00000	0E
35	MH	20msec	00E0	00000	00

7.6.6. Digital Board Section

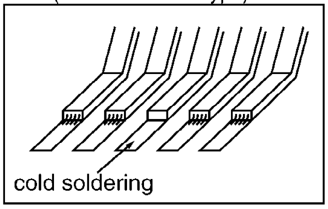
When the unit fails to boot up the system, take the troubleshooting procedures very carefully. It may have a serious problem.

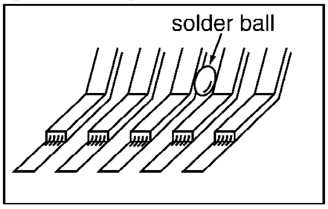
The symptom: No response when the power is turned on. (No LCD display, and keys are not accepted.)

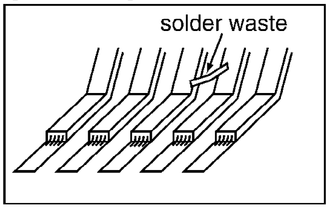
The first step is to check the power source. If there is no problem with the power supply unit, the problem may lie in the digital unit (main board).

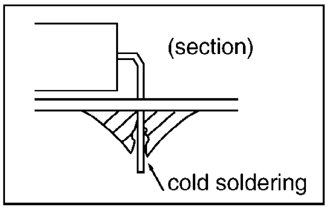
As there are many potential causes in this case (ASIC, DRAM, etc.), it may be difficult to specify what you should check first. If a mistake is made in the order of checks, a normal part may be determined faulty, wasting both time and money.

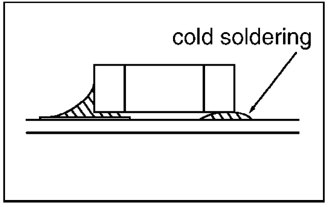
Although the tendency is to regard the problem as a serious one (IC malfunction, etc.), usually most cases are caused by solder faults (poor contact due to a tunnel in the solder, signal short circuit due to solder waste).

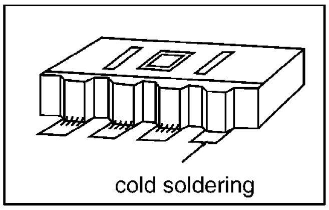

SMT(Surface Mount Type) PARTS


SMT PARTS


SMT PARTS


LEADED PARTS


CHIP PARTS (section)


RESISTOR ARRAY

Note:

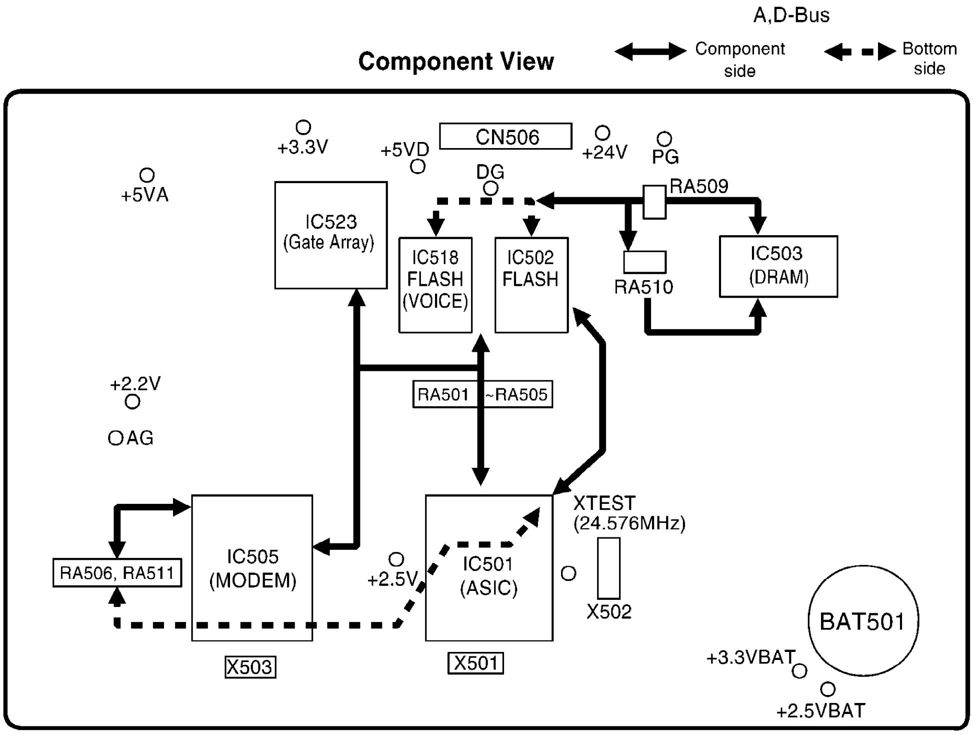
1. **Electrical continuity may have existed at the factory check, but a faulty contact occurred as a result of vibration, etc., during transport.**
2. **Solder waste remaining on the board may get caught under the IC during transport, causing a short circuit.**

Before we begin mass production, several hundred trial units are produced at the plant, various tests are applied and any malfunctions are analyzed. (In past experiences, digital IC (especially DRAM and FLASH ROM) malfunctions are extremely rare after installation in the product.)
This may be repaired by replacing the IC, (DRAM etc.). However, the real cause may not have been an IC malfunction but a soldering fault instead.
Soldering faults difficult to detect with the naked eye are common, particularly for ASIC and RA (Resistor Array). But if you have an oscilloscope, you can easily determine the problem site or IC malfunction by checking the main signal lines.
Even if you don't have such a measuring instrument, by checking each main signal line and resoldering it, in many cases the problem will be resolved.
An explanation of the main signals (for booting up the unit) is presented below.
Don't replace ICs or stop repairing until checking the signal lines.
An IC malfunction rarely occurs. (By understanding the necessary signals for booting up the unit, the "Not Boot up" display is not a serious problem.)

What are the main signals for booting up the unit?
Please refer to Digital Block Diagram ().
The ASIC (IC501) controls all the other digital ICs. When the power is turned on, the ASIC retrieves the operation code stored in the FLASH ROM (IC502), then follows the instructions for controlling each IC. All ICs have some inner registers that are assigned to a certain address.
It is the address bus by which the ASIC designates the location inside each IC. And the data bus reads or writes the data in order to transmit the instructions from the ASIC to the ICs.

These signal lines are all controlled by voltages of 3.3V (H) or 0V (L).

7.6.6.1. Digital Block Diagram


A,D-Bus
Component View
Component side
Bottom side
+3.3V
+5VD
CN506
+24V
PG
DG
+5VA
RA509
IC523 (Gate Array)
IC518 FLASH (VOICE)
IC502 FLASH
RA510
IC503 (DRAM)
+2.2V
AG
RA501 ~RA505
XTEST (24.576MHz)
RA506, RA511
IC505 (MODEM)
+2.5V
IC501 (ASIC)
X502
BAT501
+3.3VBAT
X503
X501
+2.5VBAT

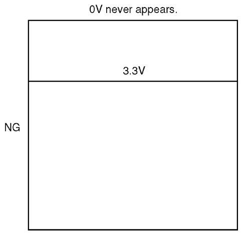
You also need to check the signal lines listed here [List 1] when the unit fails to boot up the system. Those signal lines should remain normal. Other signal lines are not directly related to that failure even if they have faults or troubles.

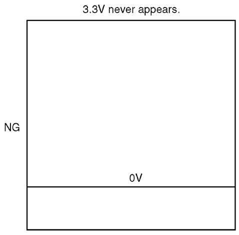
[List 1]

①	D0~D7	(Data Bus)
②	A0~A15	(Address Bus)
③	$\overline{RD}$	(Read Signal)
	$\overline{ROMCS}$	(ROM Select Signal)
	$\overline{WR}$	(Write Signal)
④	RBA0~RBA5	(Bank Address Signal)
⑤	$\overline{RAS}$	(DRAM Row Address Strobe Signal)
	$\overline{CAS}$	(DRAM Column Address Strobe Signal)
⑥	$\overline{MDMCS}$	(Modem Select Signal)

As long as these signals remain normal, once the power is turned on, each IC can repeatedly output 3.3V (H) and 0V (L) The following shows NG and normal wave patterns.

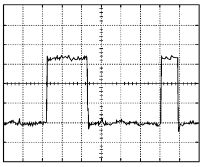
NG Wave pattern **(Refer to NG EXAMPLE)**



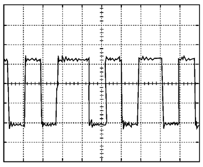


Normal Wave Patterns

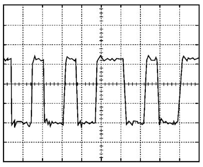
① D0~D7 200ns/div, 1V/div



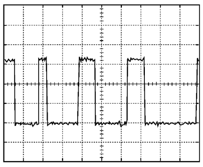
② A0~A5 200ns/div, 1V/div



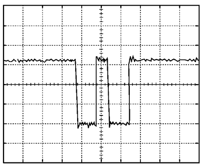
③ $\overline{RD}$ 100ns/div, 1V/div



④ $\overline{ROMCS}$ 400ns/div, 1V/div



⑤ $\overline{RAS}$, $\overline{CAS}$ 100ns/div, 1V/div



Remarks:

When you use an oscilloscope to judge whether a signal to be tested is normal or NG, perform the signal check in exactly the same order as in [List 1]. (If the ASIC fails to access the FLASH ROM, the ASIC cannot access DRAM normally.)

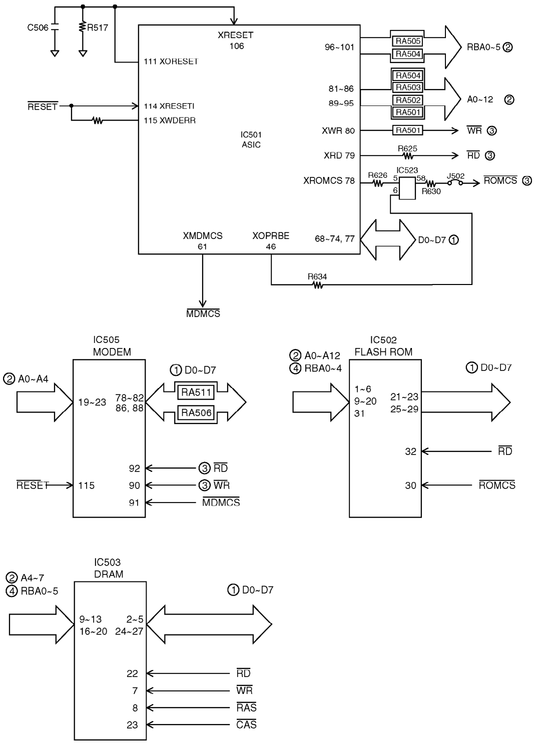
The digital circuit actually operates according to the timing combinations of these signals. If the timing of these signals is even slightly delayed, the circuit will not work. Nor will it if the IC is defective and the output voltage level is not normal although the timing of these signals is accurate enough to meet the specifications. (Make sure that your oscilloscope is calibrated before starting a test.)

Therefore, it is imperative to confirm whether each IC outputs the signal at the correct level. (See the I/O Pin No. Diagram.) The signal level should be constantly output at between 3.3V (H) and 0V (L) as described earlier.

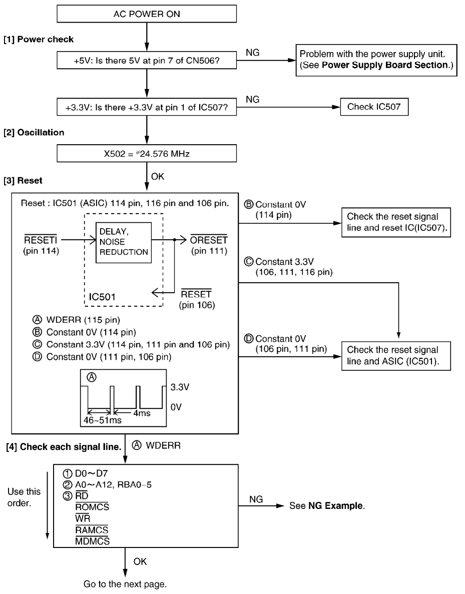
Note:

Simply check the output level and make sure if the IC repeatedly outputs the signal at between 3.3V (H) and 0V (L).

I/O and Pin No. Diagram


C506
R517
XRESET
106
111 XORESET
RESET
114 XRESETI
115 XWDERR
IC501
ASIC
96~101
RA505
RA504
RBA0~5 ②
81~86
89~95
RA503
RA502
RA501
A0~12 ②
XWR 80
WR ③
XRD 79
R625
RD ③
XROMCS 78
R626
IC523
J502
R630
ROMCS ③
XMDMCS
61
XOPRBE
46
68~74, 77
D0~D7 ①
R634
MDMCS
IC505
MODEM
② A0~A4
19~23
78~82
86, 88
① D0~D7
RA511
RA506
92
90
91
③ RD
③ WR
MDMCS
RESET
115
IC502
FLASH ROM
② A0~A12
④ RBA0~4
1~6
9~20
31
21~23
25~29
① D0~D7
32
30
RD
ROMCS
IC503
DRAM
② A4~7
④ RBA0~5
9~13
16~20
2~5
24~27
① D0~D7
22
7
8
23
RD
WR
RAS
CAS

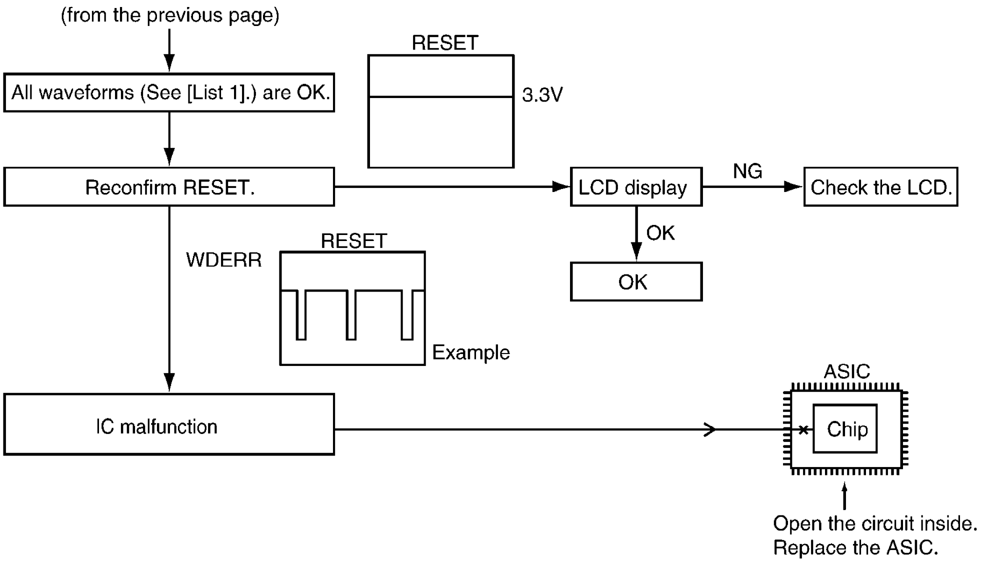
After the power is turned on, the ASIC initializes and checks each IC.
The ROM, DRAM, and modem are checked.
If initialization fails for the ICs, the system will not boot up.
In this case, please find the cause as follows.


AC POWER ON
[1] Power check
+5V: Is there 5V at pin 7 of CN506?
NG
Problem with the power supply unit. (See Power Supply Board Section.)
+3.3V: Is there +3.3V at pin 1 of IC507?
NG
Check IC507
[2] Oscillation
X502 = *24.576 MHz
OK
[3] Reset
Reset : IC501 (ASIC) 114 pin, 116 pin and 106 pin.
RESETI (pin 114)
DELAY, NOISE REDUCTION
ORESET (pin 111)
IC501
RESET (pin 106)
Ⓐ WDERR (115 pin)
Ⓑ Constant 0V (114 pin)
Ⓒ Constant 3.3V (114 pin, 111 pin and 106 pin)
Ⓓ Constant 0V (111 pin, 106 pin)
Ⓐ
3.3V
0V
4ms
46~51ms
Ⓑ Constant 0V (114 pin)
Check the reset signal line and reset IC(IC507).
Ⓒ Constant 3.3V (106, 111, 116 pin)
Ⓓ Constant 0V (106 pin, 111 pin)
Check the reset signal line and ASIC (IC501).
[4] Check each signal line.
Ⓐ WDERR
Use this order.
① D0~D7
② A0~A12, RBA0~5
③ RD
ROMCS
WR
RAMCS
MDMCS
NG
See NG Example.
OK
Go to the next page.

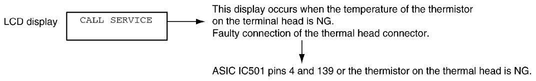
CROSS REFERENCE:

NG Example()

Power Supply Board Section()


(from the previous page)
All waveforms (See [List 1].) are OK.
RESET
3.3V
Reconfirm RESET.
LCD display
NG
Check the LCD.
OK
OK
WDERR
RESET
Example
ASIC
IC malfunction
Chip
Open the circuit inside.
Replace the ASIC.

Other NG example while the power is ON and the LCD displays the following.


LCD display
CALL SERVICE

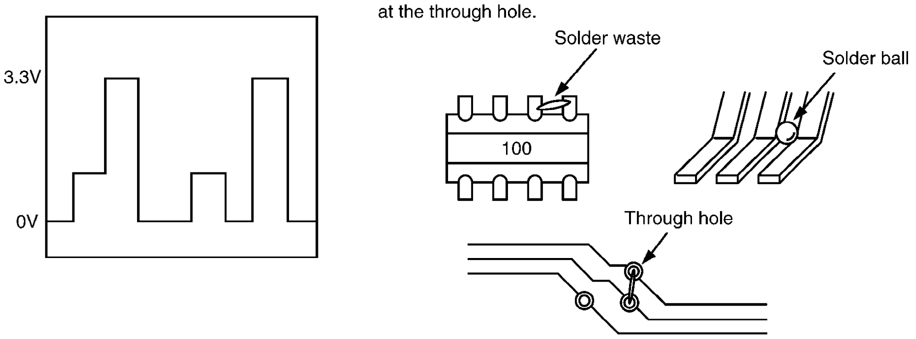
This display occurs when the temperature of the thermistor on the terminal head is NG.
Faulty connection of the thermal head connector.

ASIC IC501 pins 4 and 139 or the thermistor on the thermal head is NG.

7.6.6.2. NG Example

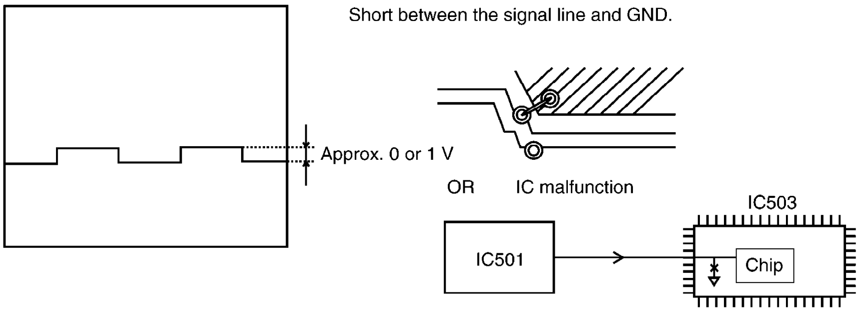
1.

Short circuit from the adjacent signal wires.
Check for a short circuit in the RA and IC leads and the signal wire at the through hole.

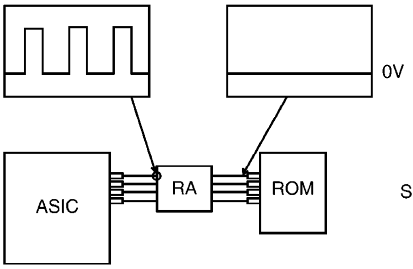

3.3V
0V
Solder waste
Solder ball
100
Through hole

2.

Short between the signal line and GND.


Approx. 0 or 1 V
OR
IC malfunction
IC503
IC501
Chip

3.


0V
ASIC
RA
ROM

Solder fault on RA.

7.6.7. Analog Board Section

This chapter provides the testing procedures required for the analog parts. A signal route to be tested is determined depending upon purposes. For example, the handset TX route begins at the handset microphone and the signal is output to the telephone line. The signal mainly flowing on this route is analog. You can trace the signal with an oscilloscope. The signal flow on each route is shown in the Check Sheet here. If you find a specific problem in the unit, for example if you cannot communicate with the H/S, trace that signal route locally with the following Check Sheet and locate the faulty point.

7.6.7.1. Check Sheet

(SYMPTOM) ITEMS TO CHECK	IN signal → ROUTE → OUT
SP-PHONE Tx	MIC → [C353 → R354 → IC351(6-7) → CN303(1)] → {CN509(1) → C697→ R717→ R756 → IC505(36-69)→ IC520(8-9) → C669 → R688 → IC521(6-7) → CN501(9)}→ CN201(9) → C117 → R110 → R191 → T101 → TEL LINE
SP-PHONE Rx	TEL LINE → T101 → C118 → R125 → IC103(6-7) → R283 → CN201(8) → {CN501(8) → C685 → IC522(4 - 3) → C711 → R576 → IC505(60 - 47) → C677 → R700 → Q526(B - C) → C682 → IC501(32 - 31) → C683 → R705 → IC521(2 - 1)→ CN501(10)} → CN201(10) → C131 → R133 → IC102 (4 - 5,8) → CN105(1, 2) → SPEAKER
DTMF MONITOR SPEAKER	{IC505(47) → C677 → R700 → Q526(B-C)→ C682 → IC501(32-31) → C683 → R705→ IC521(2-1) → CN501(10)} → CN201(10)→ C131 → R133 → IC102(4-5, 8) → CN105(1, 2) → SPEAKER
FAX Tx DTMF for TEL Line	{IC505(69) → IC520(8-9) → C669 → R688 → IC521(6-7) → CN501(9)} → CN201(9) → C117 → R110 → R191 → T101 → TEL LINE
FAX Rx CNG/DTMF/VOX detection, ICM Rec., Call waiting	TEL LINE → T101 → C118 → R125 → IC103(6-7) → R283 → CN201(8) → {CN501(8)→ C685 → IC522(4-3) → C711 → R576 → IC505(60)}
Greeting for TEL LINE Message for TEL LINE	{IC505(69) → IC520(8-9) → C669 → R688 → IC521(6-7)→ CN501(9)} → CN201(9) → C117 → R110 → R191 → T101 → TEL LINE
Greeting/Memo Rec.	MIC → [C353 → R354 → IC351(6-7)→ CN303(1)] → {CN509(1) → C697→ R717 → R756 → IC505(36)}
Caller ID	TEL LINE → T101 → C118 → R125 → IC103(6-7) → C305 → R272 → IC103(2-1)→ CN201(7) → {CN501(7) → C572 → R579 → IC505(62)}
Beep for TEL LINE	{IC501(28) → R704 → IC520(11-10) → C670 → R689 → IC521(6-7) → CN501(9)} → CN201(9) → C117 → R110 → R191 → T101 → TEL LINE
Ringing/Beep/ Alarm/Key Tones	{IC501(29) → R703 → C679 → IC520(2-1) → R702 → Q526(B-C) → C682 → IC501(32-31) → C683 R705 → IC521(2-1) →CN501(10)} → CN201(10) → C131 → R133 → IC102(4, 5-8) → CN105(1, 2) → SPEAKER

Note:
{ }: Inside the digital board
[ ]: Inside the operation board

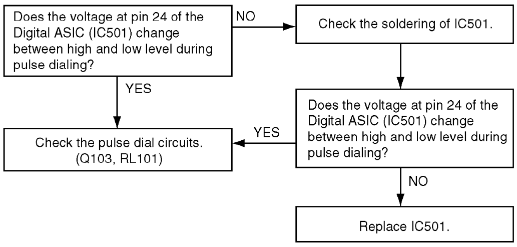
(SYMPTOM) ITEMS TO CHECK	IN → signal ROUTE → OUT
Portable Handset Tx	(Portable Handset) MIC → C232 → R231 → IC201(46-47, 57) → RF UNIT(15) → ANT ↳ C230 → R229 (Cordless Base Block) ANT → RF UNIT → IC501(66, 34) → R431 → C432 → CN1(13) (Main Block) {CN510(13) → C667 → R684 → R685 → C712 → R745 → R749 → R687 → IC521(6-7) → CN501(9)} → CN201(9) → C117 → R110 → R191 → T101 → TEL LINE
Portable Handset Rx	(Main Block) TEL LINE → T101 → C118 → R125 → IC103(6-7) → R283 → CN201(8) → {CN501(8) → IC520(3-4) → C676 → R699 → Q526(B-C) → C682 → IC501(32-31) → C683 → R705 → IC521(2-1) → R694 → C674 → R748 → IC522(8-9) → CN510(12)} → (Cordless Base Block) (Cordless Base Block) CN1(12) → R434→ C445 → C441 → IC501(36-57) → RF UNIT → ANT (Portable Handset) ANT → RF UNIT → IC201(66, 33-44) → R302 → SPEAKER ↳ C257 → Headset → C301 → R303 → L209 (Option)
Intercom Cordless H/S → Base	(Portable Handset) MIC → C232 → R231 → IC201(46-47, 57) → RF UNIT(15) → ANT ↳ C230 → R229 (Cordless Base Block) ANT → RF UNIT → IC501(66, 34) → R431 → C432 → CN1(13) (Main Block) {CN510(13) → C573 → R758 → C723 → IC522(1-2) → C711 → R576 → IC505(60,47) → C677 → R700 → Q526(B, C) → C682 → IC501(32-31) → C683 → R705 → IC521(2-1) → CN501(10)} → CN201(10) → C131 → R133 → IC102(4-5, 8) → CN105(1, 2) → SPEAKER
Intercom Base → Cordless H/S	(Main Block) MIC → [C353 → R354 → IC351(6-7) → CN303(1)] → {CN509(1) → C697 → R717 → R756 → IC505(36-69) → R706 → C684 → IC522(11, 10) → CN510(12)} (Cordless Base Block) CN1(12) → R434 → C445 → C441 → IC501(36-57) → RF UNIT → ANT (Portable Handset) ANT → RF UNIT → IC201(66, 33-44) → R302 → SPEAKER ↳ C257 → Headset → C301 → R303 → L209 (Option)

Note:
{ }: Inside the digital board
[ ]: Inside the operation board

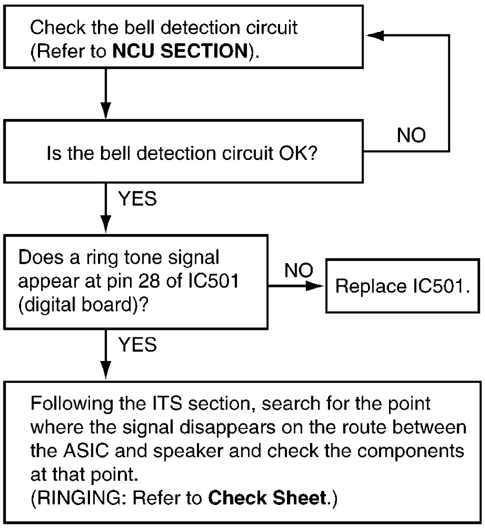
7.6.7.2. Defective ITS (Integrated Telephone System) Section

1. No handset transmission / reception and no monitor reception
Perform a signal test in the ITS or the NCU section and locate a defective point (where the signal disappears) on each route between the handset microphone and telephone line (sending), or between the telephone line and the handset speaker (receiving), or between the microphone and the telephone line (sending), or between the telephone line and the speaker (receiving). Check the components at that point. Check Sheet() is useful for this investigation.

2. No pulse dialing


Does the voltage at pin 24 of the Digital ASIC (IC501) change between high and low level during pulse dialing?
NO
Check the soldering of IC501.
YES
Does the voltage at pin 24 of the Digital ASIC (IC501) change between high and low level during pulse dialing?
YES
Check the pulse dial circuits. (Q103, RL101)
NO
Replace IC501.

3. No ring tone (or No bell)

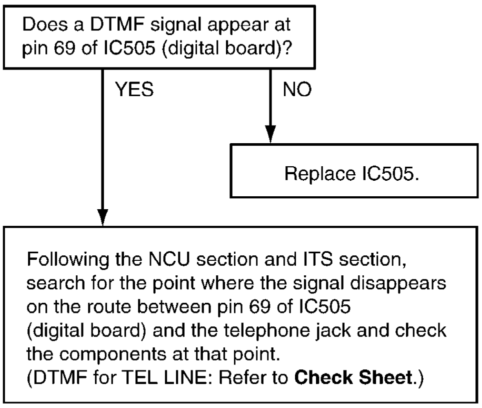

Check the bell detection circuit (Refer to NCU SECTION).
Is the bell detection circuit OK?
NO
YES
Does a ring tone signal appear at pin 28 of IC501 (digital board)?
NO
Replace IC501.
YES
Following the ITS section, search for the point where the signal disappears on the route between the ASIC and speaker and check the components at that point.
(RINGING: Refer to Check Sheet.)

CROSS REFERENCE:

Check Sheet()

NCU SECTION()

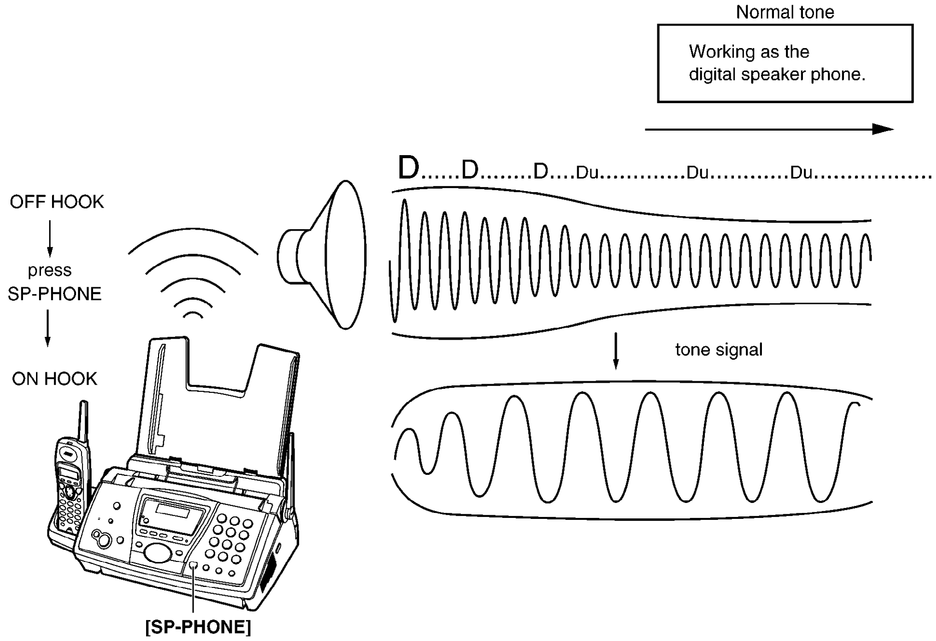
4. No tone dialing


Does a DTMF signal appear at pin 69 of IC505 (digital board)?
YES
NO
Replace IC505.
Following the NCU section and ITS section, search for the point where the signal disappears on the route between pin 69 of IC505 (digital board) and the telephone jack and check the components at that point.
(DTMF for TEL LINE: Refer to Check Sheet.)

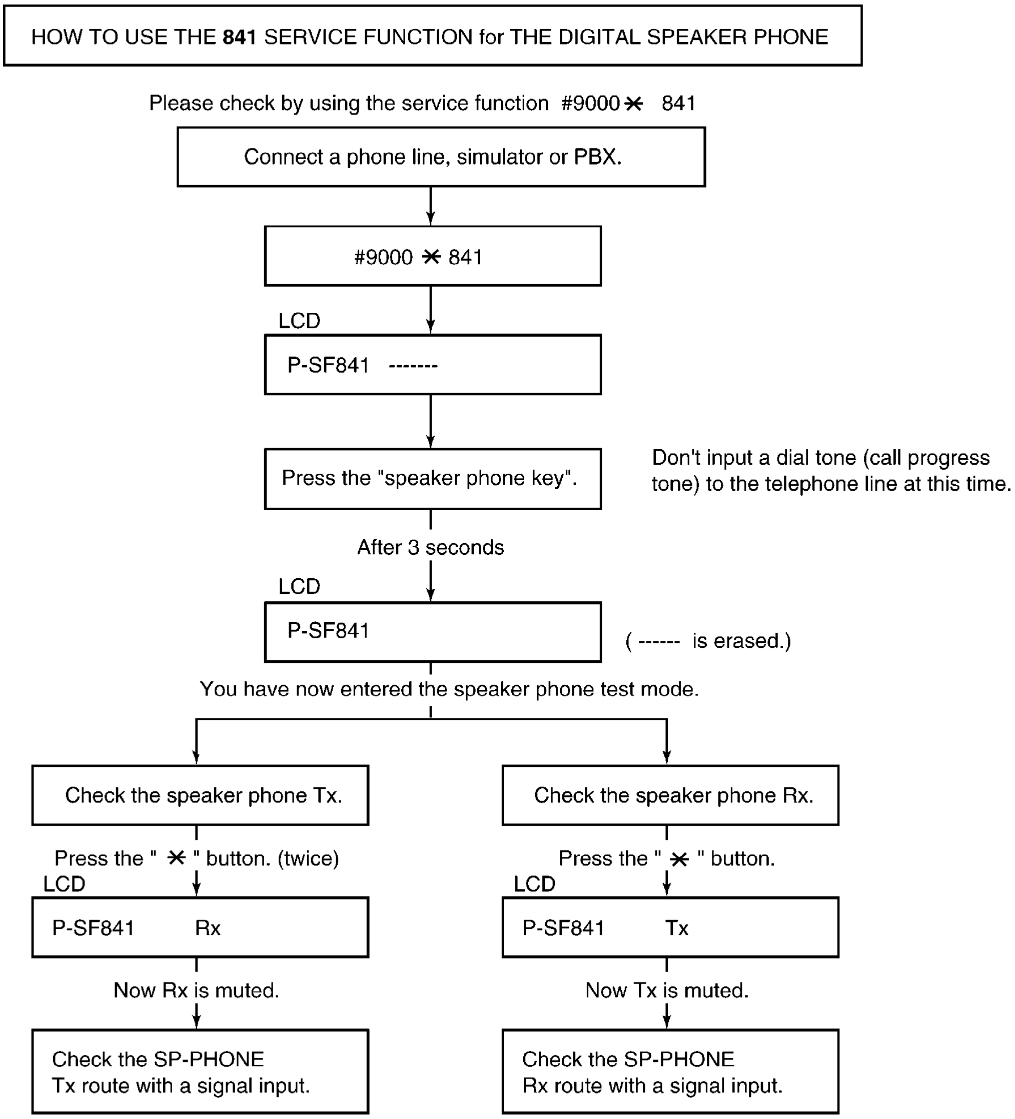
CROSS REFERENCE:
Check Sheet()

7.6.8. Digital Speakerphone

The digital speakerphone has different features from the analog speakerphone.
The analog speakerphone switches between Tx or Rx. Either Tx or Rx is able to pass through a telephone line or speaker, depending on the Tx and Rx signal (voice) level. The higher-level signal (either TX or RX) can pass through the route.
Therefore, you never hear the other party's voice while you are talking. However, the digital speakerphone allows you to hear the other party's voice while you are talking. So both Tx and Rx are active at the same time. There is also a difference in the troubleshooting procedures between the two types.
At the start of communication, during the initial 2~3 correspondences, the digital speakerphone performs half-duplex operation, alternating between transmission (Tx) and reception (Rx). Then duplex communication becomes available.
Learning occurs during the initial 2~3 correspondences in order to set the appropriate parameters for duplex communication.


Normal tone
Working as the digital speaker phone.
D......D........D....Du.............Du............Du..................
OFF HOOK
press
SP-PHONE
ON HOOK
tone signal
[SP-PHONE]

You cannot check the digital speaker phone by the signal route test mentioned in the Analog Board Section because the level is always changing as stated above.
Therefore, there is a service function for this troubleshooting. In this service mode, you can set the mute to either Tx or Rx. Then you can check the signal route of the speaker phone Tx or the speaker phone Rx without any disturbances.


HOW TO USE THE 841 SERVICE FUNCTION for THE DIGITAL SPEAKER PHONE
Please check by using the service function #9000✱ 841
Connect a phone line, simulator or PBX.
#9000 ✱ 841
LCD
P-SF841 -------
Press the "speaker phone key".
Don't input a dial tone (call progress tone) to the telephone line at this time.
After 3 seconds
LCD
P-SF841
(------ is erased.)
You have now entered the speaker phone test mode.
Check the speaker phone Tx.
Check the speaker phone Rx.
Press the " ✱ " button. (twice)
Press the " ✱ " button.
LCD
P-SF841 Rx
LCD
P-SF841 Tx
Now Rx is muted.
Now Tx is muted.
Check the SP-PHONE Tx route with a signal input.
Check the SP-PHONE Rx route with a signal input.

Note:

Check to the SP-Phone Rx/Tx signal routes. (Refer to Check Sheet ()).

7.6.9. Power Supply Board Section

7.6.9.1. Key Components for Troubleshooting

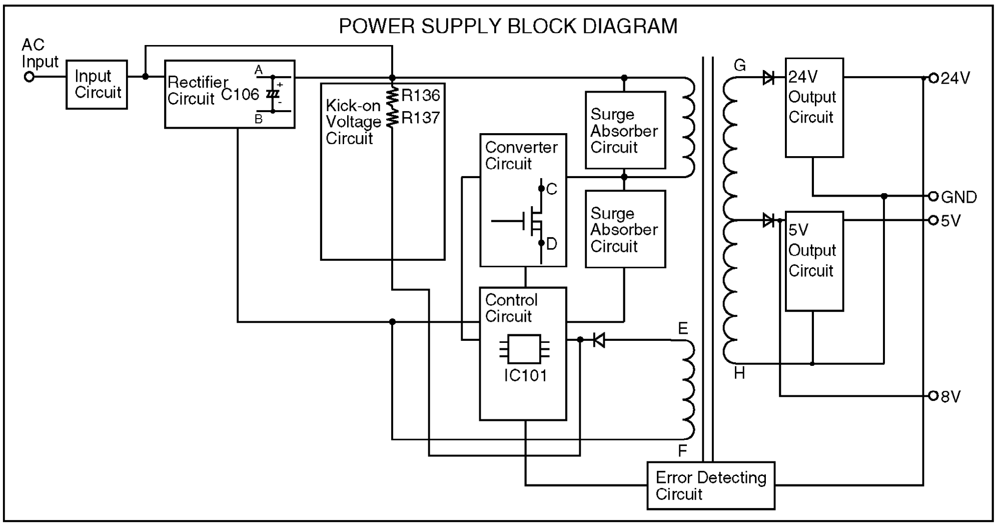
Check the following parts first: F101, D101-D104, C106, Q101, PC101 and IC101.
This comes from our experience with experimental tests. For example: power supply and lightning surge voltage test, withstanding voltage test, intentional short circuit test, etc.

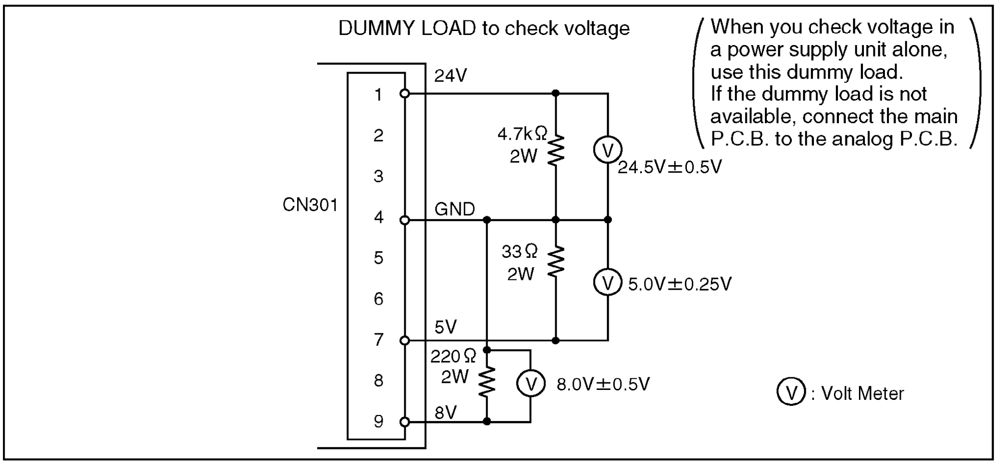
Caution:

If you find a melted fuse in the unit, do not turn on the power until you locate and repair the faulty parts (except for the fuse); otherwise the fuse will melt again and you cannot pinpoint the faulty point.

In most cases, the symptom is that nothing is output. It is more likely that the fault is in the

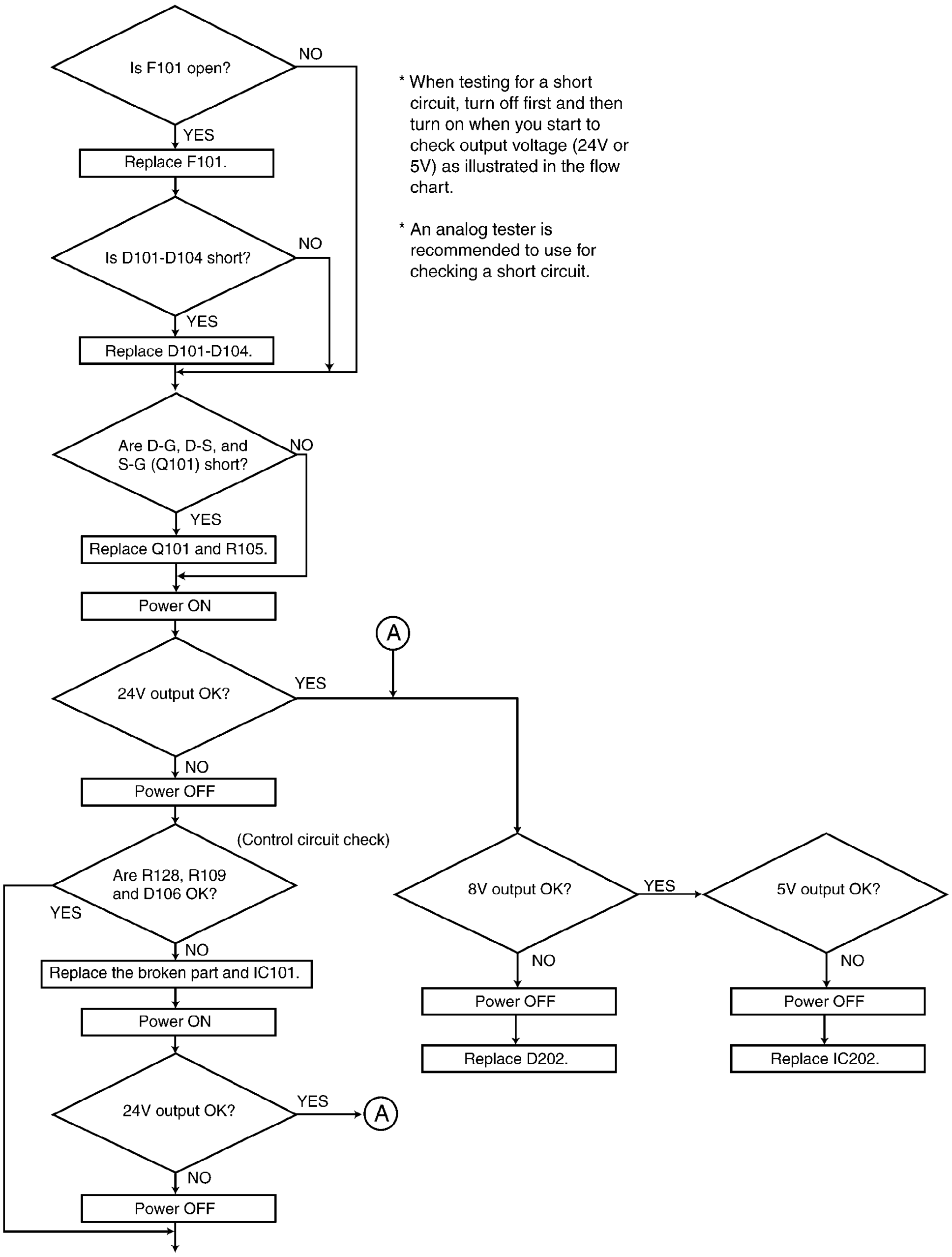
primary side rather than the secondary side. Check the primary side first.


POWER SUPPLY BLOCK DIAGRAM
AC Input
Input Circuit
Rectifier Circuit
C106
A
B
Kick-on Voltage Circuit
R136
R137
Converter Circuit
C
D
Surge Absorber Circuit
Surge Absorber Circuit
Control Circuit
IC101
E
F
G
H
24V Output Circuit
5V Output Circuit
24V
GND
5V
8V
Error Detecting Circuit


DUMMY LOAD to check voltage
CN301
1
2
3
4
5
6
7
8
9
24V
GND
5V
8V
4.7kΩ 2W
33Ω 2W
220Ω 2W
24.5V±0.5V
5.0V±0.25V
8.0V±0.5V
V : Volt Meter

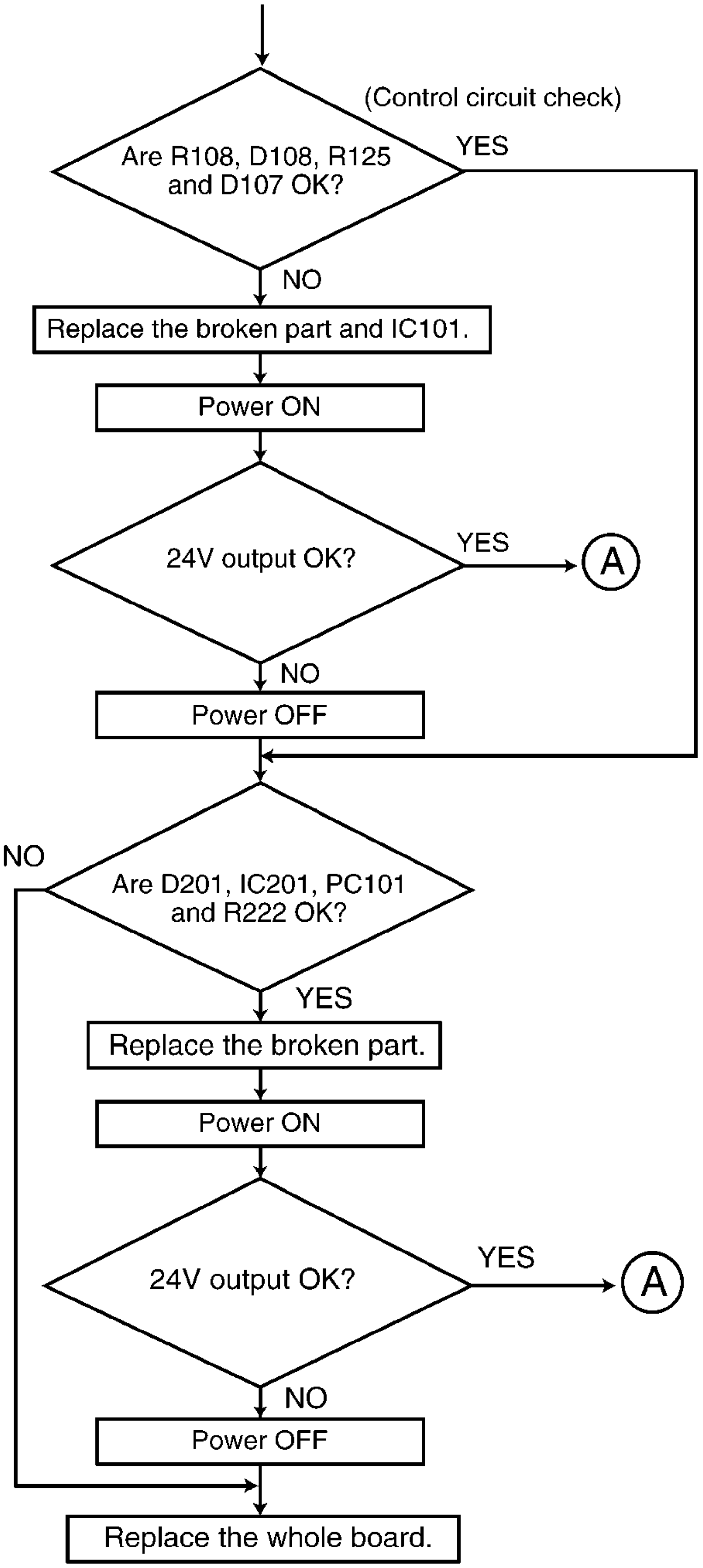
(When you check voltage in a power supply unit alone, use this dummy load. If the dummy load is not available, connect the main P.C.B. to the analog P.C.B.)

7.6.9.2. Troubleshooting Flow Chart


Is F101 open?
NO
YES
Replace F101.
Is D101-D104 short?
NO
YES
Replace D101-D104.
Are D-G, D-S, and S-G (Q101) short?
NO
YES
Replace Q101 and R105.
Power ON
A
24V output OK?
YES
NO
Power OFF
(Control circuit check)
Are R128, R109 and D106 OK?
YES
NO
Replace the broken part and IC101.
Power ON
24V output OK?
YES
A
NO
Power OFF
8V output OK?
YES
NO
Power OFF
Replace D202.
5V output OK?
NO
Power OFF
Replace IC202.

* When testing for a short circuit, turn off first and then turn on when you start to check output voltage (24V or 5V) as illustrated in the flow chart.

* An analog tester is recommended to use for checking a short circuit.

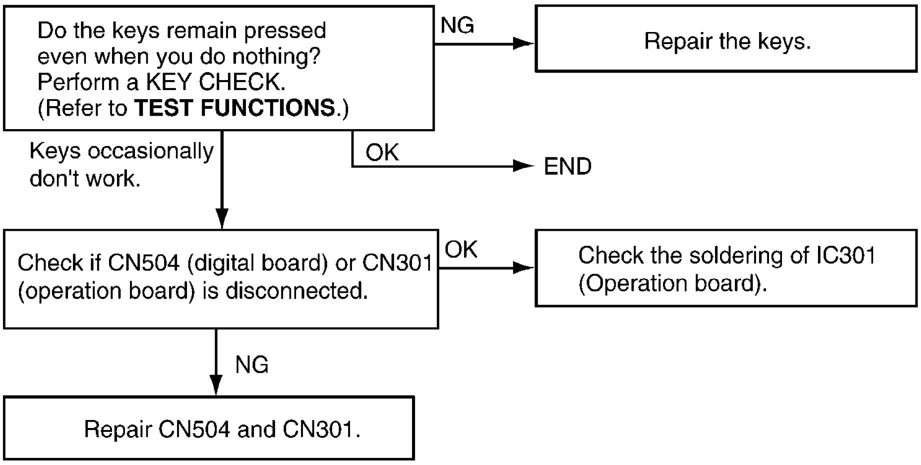

(Control circuit check)
Are R108, D108, R125 and D107 OK?
YES
NO
Replace the broken part and IC101.
Power ON
24V output OK?
YES
A
NO
Power OFF
NO
Are D201, IC201, PC101 and R222 OK?
YES
Replace the broken part.
Power ON
24V output OK?
YES
A
NO
Power OFF
Replace the whole board.

7.6.9.3. Broken Parts Repair Details

(D101, D102, D103, D104)
Check for a short-circuit in terminal 4. If D101, D102, D103 and D104 are short-circuits, F101 will melt (open).
In this case, replace all of the parts (D101, D102, D103, D104, F101).
(Q101)
The worst case of Q101 is a short-circuit between the Drain and Gate because damage expands to the peripheral circuit of Q101.
This is due to a very high voltage through the Gate circuit which is composed of R128, R109, D106 and IC101.
You should change all of the parts listed as follows.
F101, Q101, R128, R109, D106, IC101
(D201)
If D201 is broken, the oscillation circuit in the power supply cannot operate. Check it with an electric tester.

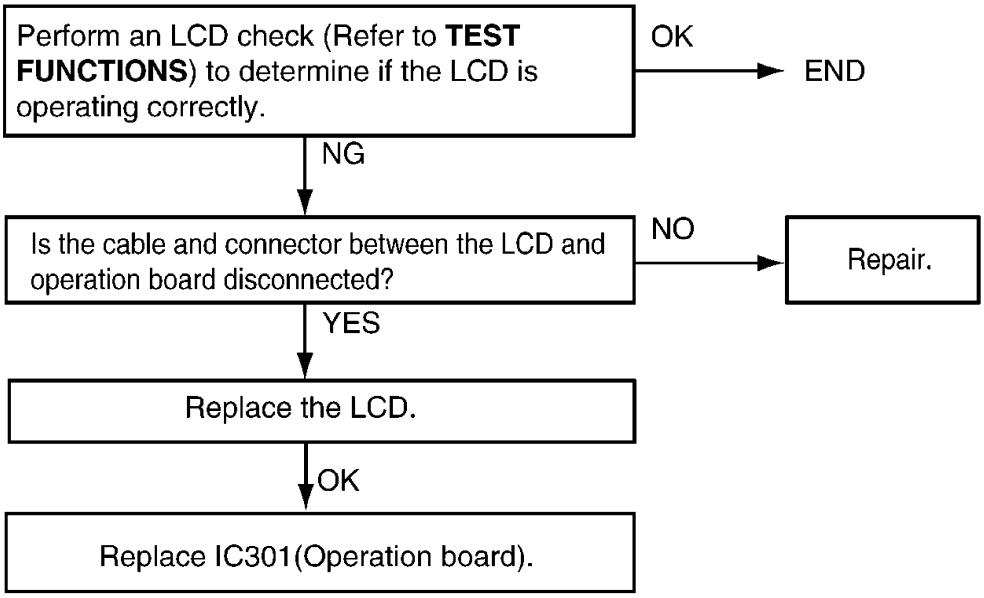
7.6.10. Operation Panel Section

7.6.10.1. No Key Operation


Do the keys remain pressed even when you do nothing? Perform a KEY CHECK. (Refer to **TEST FUNCTIONS**.)
NG
Repair the keys.
Keys occasionally don't work.
OK
END
Check if CN504 (digital board) or CN301 (operation board) is disconnected.
OK
Check the soldering of IC301 (Operation board).
NG
Repair CN504 and CN301.

CROSS REFERENCE:
TEST FUNCTIONS()

7.6.10.2. No LCD Indication

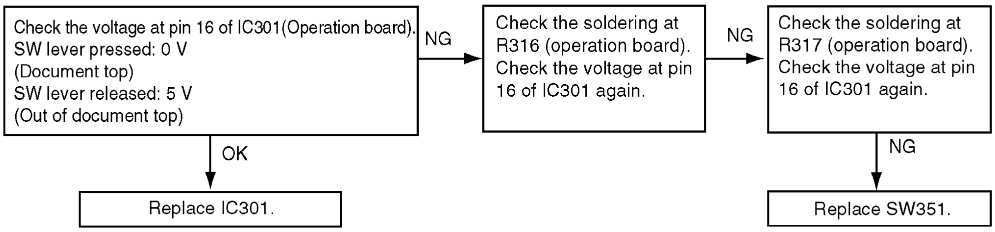

Perform an LCD check (Refer to **TEST FUNCTIONS**) to determine if the LCD is operating correctly.
OK
END
NG
Is the cable and connector between the LCD and operation board disconnected?
NO
Repair.
YES
Replace the LCD.
OK
Replace IC301(Operation board).

CROSS REFERENCE:
TEST FUNCTIONS()

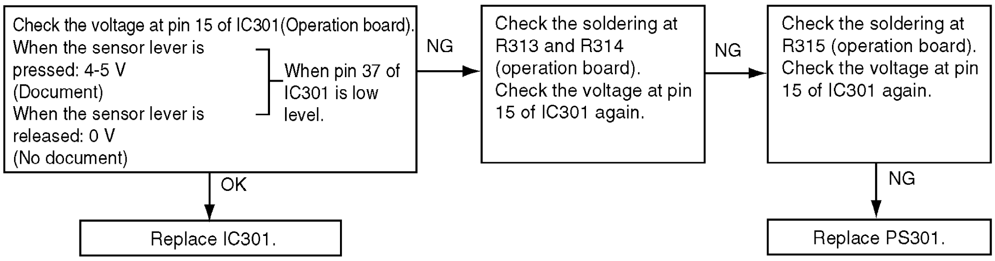
7.6.11. Sensor Section

Refer to SENSORS AND SWITCHES() for the circuit descriptions.
The Test Function makes the sensor circuit check easier. (Refer to TEST FUNCTIONS().)
For example, as for "FILM END/COVER OPEN SENSOR", "CO" is turned ON/OFF on the display when you open or close the cover. Also, document sensor, read position sensor, recording paper sensor are turned ON/OFF by the copy operation. Therefore, each sensor can be checked for proper mechanical operation.
As for the electric check, check whether each voltage is right or not with following flowchart turning each sensor lever ON/OFF manually.

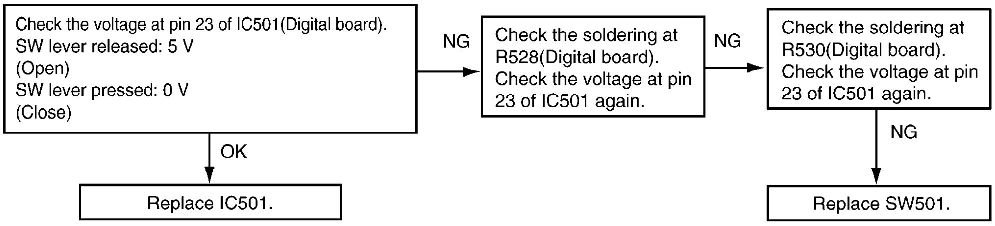
7.6.11.1. Check the Document Top SW (SW351)................."REMOVE DOCUMENT"


Check the voltage at pin 16 of IC301(Operation board).
SW lever pressed: 0 V
(Document top)
SW lever released: 5 V
(Out of document top)
NG
Check the soldering at R316 (operation board). Check the voltage at pin 16 of IC301 again.
NG
Check the soldering at R317 (operation board). Check the voltage at pin 16 of IC301 again.
OK
Replace IC301.
NG
Replace SW351.

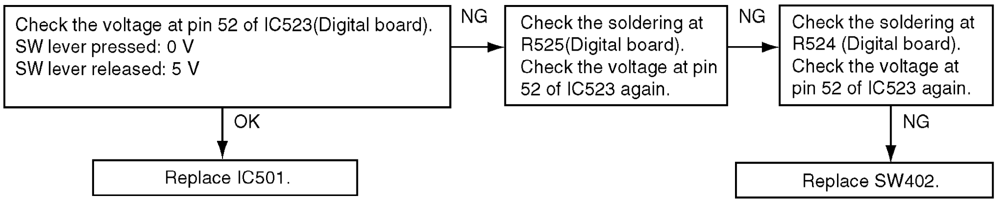
7.6.11.2. Check the Document Set Sensor (PS301)................."CHECK DOCUMENT"


Check the voltage at pin 15 of IC301(Operation board).
When the sensor lever is pressed: 4-5 V (Document)
When the sensor lever is released: 0 V (No document)
When pin 37 of IC301 is low level.
NG
Check the soldering at R313 and R314 (operation board). Check the voltage at pin 15 of IC301 again.
NG
Check the soldering at R315 (operation board). Check the voltage at pin 15 of IC301 again.
OK
Replace IC301.
NG
Replace PS301.

7.6.11.3. Check the Cover Open and the Film End SW (SW501)................."COVER OPEN " or "CHECK FILM"

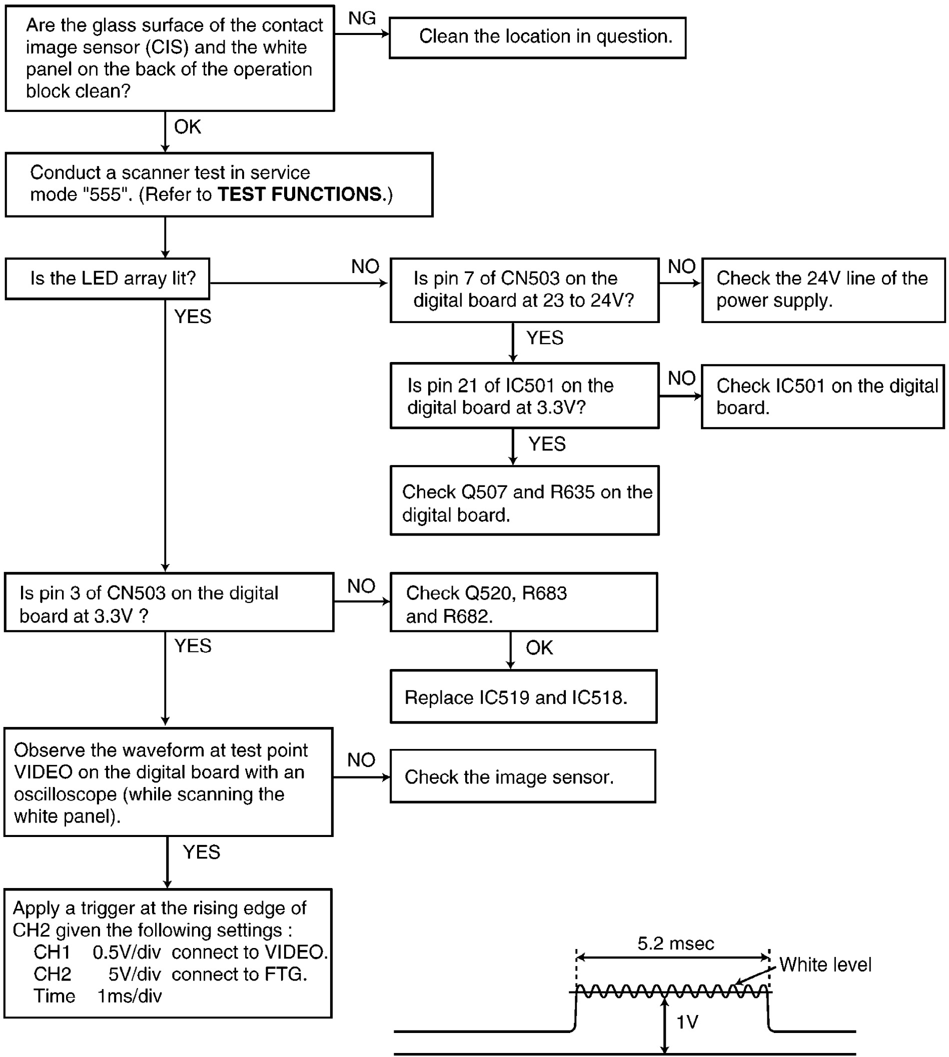

Check the voltage at pin 23 of IC501(Digital board).
SW lever released: 5 V
(Open)
SW lever pressed: 0 V
(Close)
NG
Check the soldering at R528(Digital board). Check the voltage at pin 23 of IC501 again.
NG
Check the soldering at R530(Digital board). Check the voltage at pin 23 of IC501 again.
OK
Replace IC501.
NG
Replace SW501.

7.6.11.4. Check the Paper Top SW (SW402)........................"PAPER JAMMED"

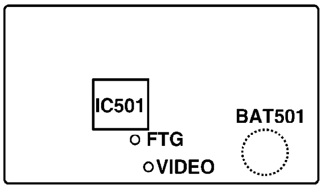

Check the voltage at pin 52 of IC523(Digital board).
SW lever pressed: 0 V
SW lever released: 5 V
NG
Check the soldering at R525(Digital board). Check the voltage at pin 52 of IC523 again.
NG
Check the soldering at R524 (Digital board). Check the voltage at pin 52 of IC523 again.
OK
Replace IC501.
NG
Replace SW402.

7.6.12. CIS (Contact Image Sensor) Section

Refer to Scanning Block().


Are the glass surface of the contact image sensor (CIS) and the white panel on the back of the operation block clean?
NG
Clean the location in question.
OK
Conduct a scanner test in service mode "555". (Refer to **TEST FUNCTIONS**.)
Is the LED array lit?
NO
Is pin 7 of CN503 on the digital board at 23 to 24V?
NO
Check the 24V line of the power supply.
YES
Is pin 21 of IC501 on the digital board at 3.3V?
NO
Check IC501 on the digital board.
YES
Check Q507 and R635 on the digital board.
YES
Is pin 3 of CN503 on the digital board at 3.3V ?
NO
Check Q520, R683 and R682.
OK
Replace IC519 and IC518.
YES
Observe the waveform at test point VIDEO on the digital board with an oscilloscope (while scanning the white panel).
NO
Check the image sensor.
YES
Apply a trigger at the rising edge of CH2 given the following settings :
CH1 0.5V/div connect to VIDEO.
CH2 5V/div connect to FTG.
Time 1ms/div
5.2 msec
White level
1V

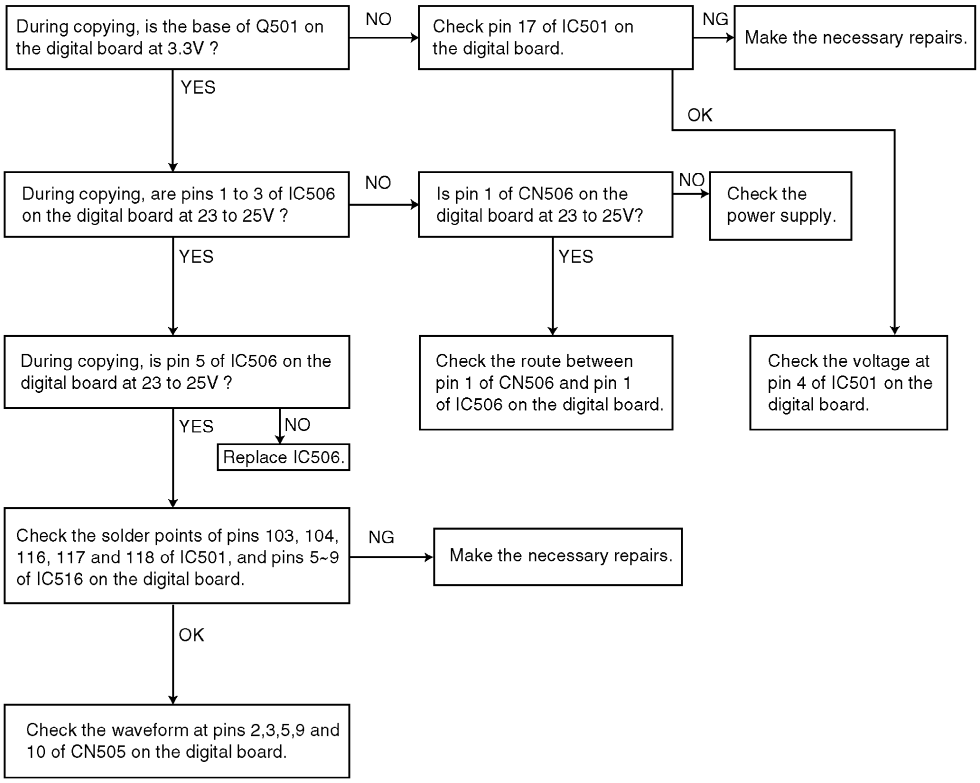
Digital Board
(Component View)


IC501
BAT501
FTG
VIDEO

CROSS REFERENCE:
TEST FUNCTIONS()

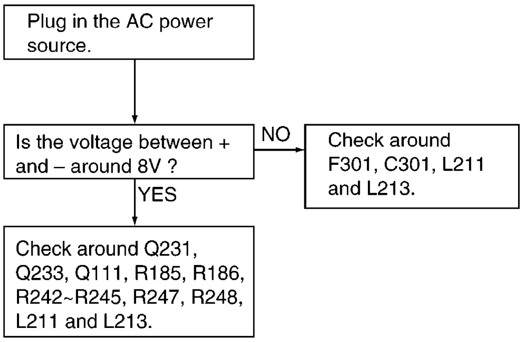
7.6.13. Thermal Head Section

Refer to Thermal Head().

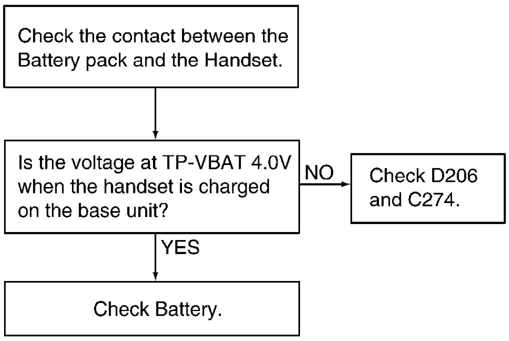

During copying, is the base of Q501 on the digital board at 3.3V ?
NO
Check pin 17 of IC501 on the digital board.
NG
Make the necessary repairs.
OK
YES
During copying, are pins 1 to 3 of IC506 on the digital board at 23 to 25V ?
NO
Is pin 1 of CN506 on the digital board at 23 to 25V?
NO
Check the power supply.
YES
YES
During copying, is pin 5 of IC506 on the digital board at 23 to 25V ?
Check the route between pin 1 of CN506 and pin 1 of IC506 on the digital board.
Check the voltage at pin 4 of IC501 on the digital board.
YES
NO
Replace IC506.
Check the solder points of pins 103, 104, 116, 117 and 118 of IC501, and pins 5~9 of IC516 on the digital board.
NG
Make the necessary repairs.
OK
Check the waveform at pins 2,3,5,9 and 10 of CN505 on the digital board.

7.6.14. Cordless Section

7.6.14.1. Battery won’t Charge (Analog Board)

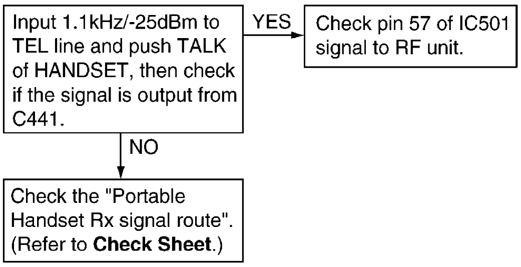

Plug in the AC power source.
Is the voltage between + and – around 8V ?
NO
Check around F301, C301, L211 and L213.
YES
Check around Q231, Q233, Q111, R185, R186, R242~R245, R247, R248, L211 and L213.

7.6.14.2. Battery won’t Charge (Handset)

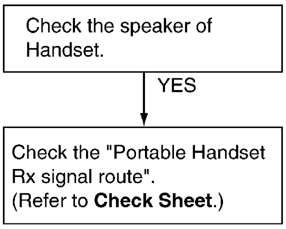

Check the contact between the Battery pack and the Handset.
Is the voltage at TP-VBAT 4.0V when the handset is charged on the base unit?
NO
Check D206 and C274.
YES
Check Battery.

7.6.14.3. No Voice Reception

BASE UNIT


Input 1.1kHz/-25dBm to TEL line and push TALK of HANDSET, then check if the signal is output from C441.
YES
Check pin 57 of IC501 signal to RF unit.
NO
Check the "Portable Handset Rx signal route". (Refer to Check Sheet.)

HANDSET

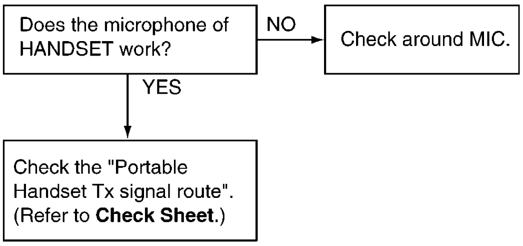

Check the speaker of Handset.
YES
Check the "Portable Handset Rx signal route". (Refer to Check Sheet.)

CROSS REFERENCE:

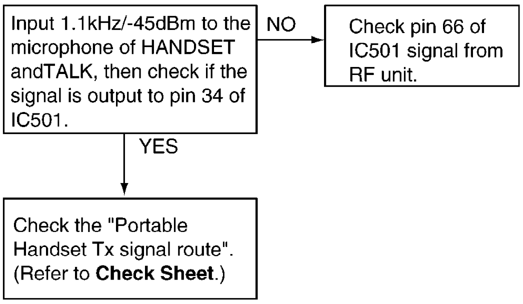
Check Sheet().

7.6.14.4. No Voice Transmission

HANDSET


Does the microphone of HANDSET work?
NO
Check around MIC.
YES
Check the "Portable Handset Tx signal route". (Refer to Check Sheet.)

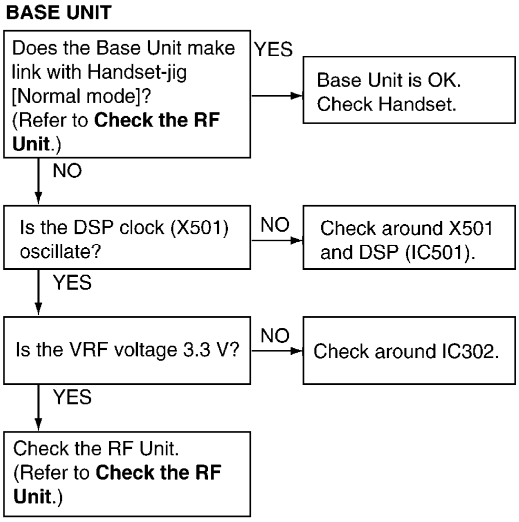
BASE UNIT

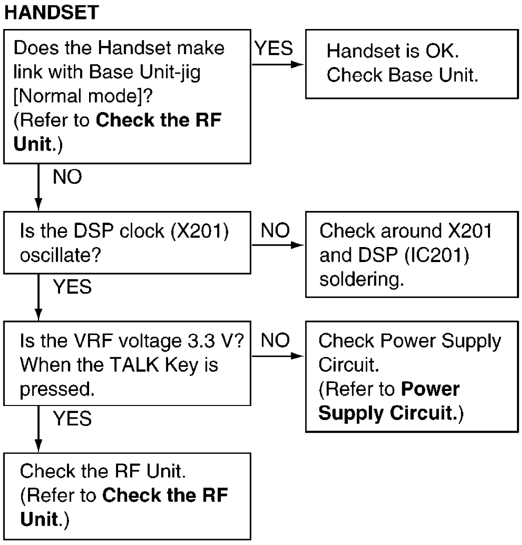

Input 1.1kHz/-45dBm to the microphone of HANDSET andTALK, then check if the signal is output to pin 34 of IC501.
NO
Check pin 66 of IC501 signal from RF unit.
YES
Check the "Portable Handset Tx signal route". (Refer to Check Sheet.)

CROSS REFERENCE:

Check Sheet().

7.6.15. Check Link


BASE UNIT
Does the Base Unit make link with Handset-jig [Normal mode]? (Refer to Check the RF Unit.)
YES
Base Unit is OK. Check Handset.
NO
Is the DSP clock (X501) oscillate?
NO
Check around X501 and DSP (IC501).
YES
Is the VRF voltage 3.3 V?
NO
Check around IC302.
YES
Check the RF Unit. (Refer to Check the RF Unit.)


HANDSET
Does the Handset make link with Base Unit-jig [Normal mode]? (Refer to Check the RF Unit.)
YES
Handset is OK. Check Base Unit.
NO
Is the DSP clock (X201) oscillate?
NO
Check around X201 and DSP (IC201) soldering.
YES
Is the VRF voltage 3.3 V? When the TALK Key is pressed.
NO
Check Power Supply Circuit. (Refer to Power Supply Circuit.)
YES
Check the RF Unit. (Refer to Check the RF Unit.)

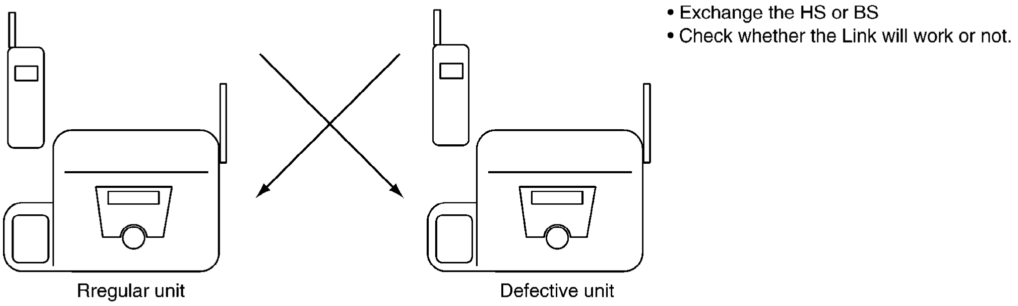
CROSS REFERENCE:
Check the RF Unit().
Power Supply Circuit().

7.6.16. Check the RF Unit

7.6.16.1. Defective Unit Check

The defective unit should be checked using the HS of Regular unit (working) and BS of Regular unit (working). Both* of Regular unit (working) are required as the defect may be either in the handset or the base of the defective unit. For a defective BASE UNIT, place HS of Regular unit (working) on the cradle of the unit and check to see that the handset links with the base. To

confirm that they do link, lift handset off the cradle and press TALK button. A beep is heard and it can talk. For a defective HANDSET UNIT, place HS on the cradle of the BS of Regular unit (working) and check to see that the HS links with the base. Again, press TALK button. A beep is heard and it can talk.



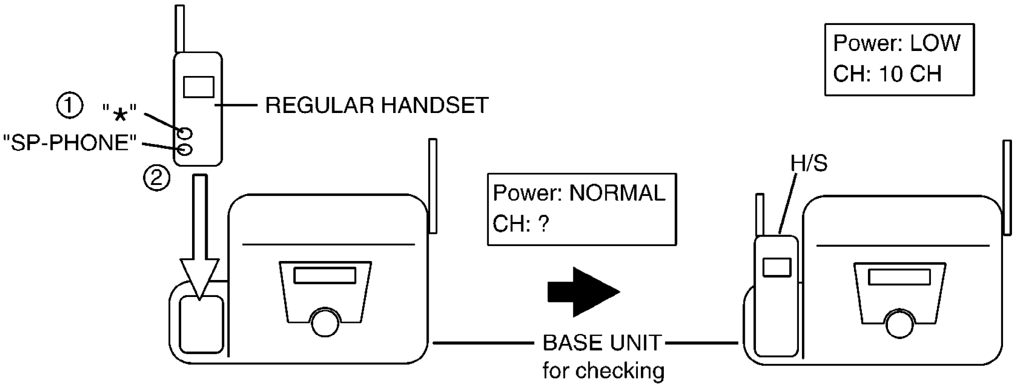
See RF Check Flow Chart ().
See Check Table for RF Block ().

7.6.16.2. Convering a Regular Production Unit to a Jig

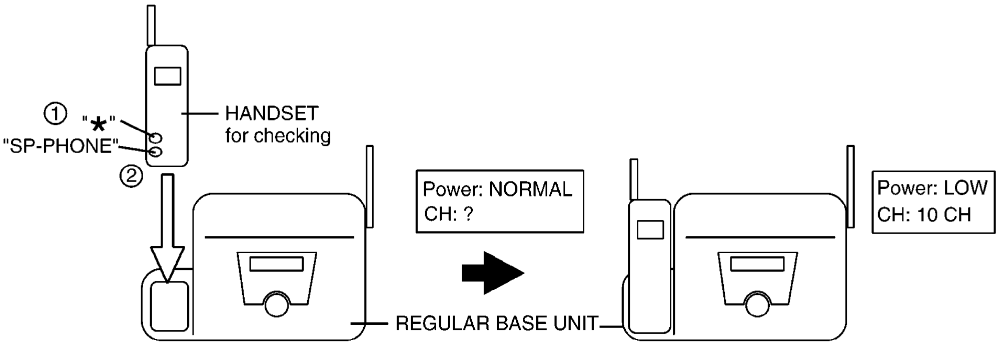
Both base unit and handset unit have two modes: TEST POWER LOW mode and NORMAL POWER mode even a Regular production unit.
Each unit can be used as a JIG by changing the original NORMAL POWER mode to TEST POWER LOW mode.

- **NORMAL POWER mode.**
  In this mode both base unit and handset unit can be used as a regular set.
- **TEST POWER LOW mode, when production unit has been changed into a jig and will be used to check RF link.**
  In this mode it is for checking if the sensitivity of RF block for both base unit and handset unit are good or not. Procedure as follows to enter this mode.
  (1) Press “SP-PHONE” and “⁎” of the handset simultaneously, and keep it (10CH is taken for example).
  (2) Place the handset unit on the cradle of the base unit. (A long beep sounds, and the display is not changed.)
  As shown in below a) HANDSET, b) BASE UNIT

a) HANDSET


①
"*"
"SP-PHONE"
②
REGULAR HANDSET
Power: NORMAL
CH: ?
Power: LOW
CH: 10 CH
H/S
BASE UNIT
for checking

b) BASE UNIT

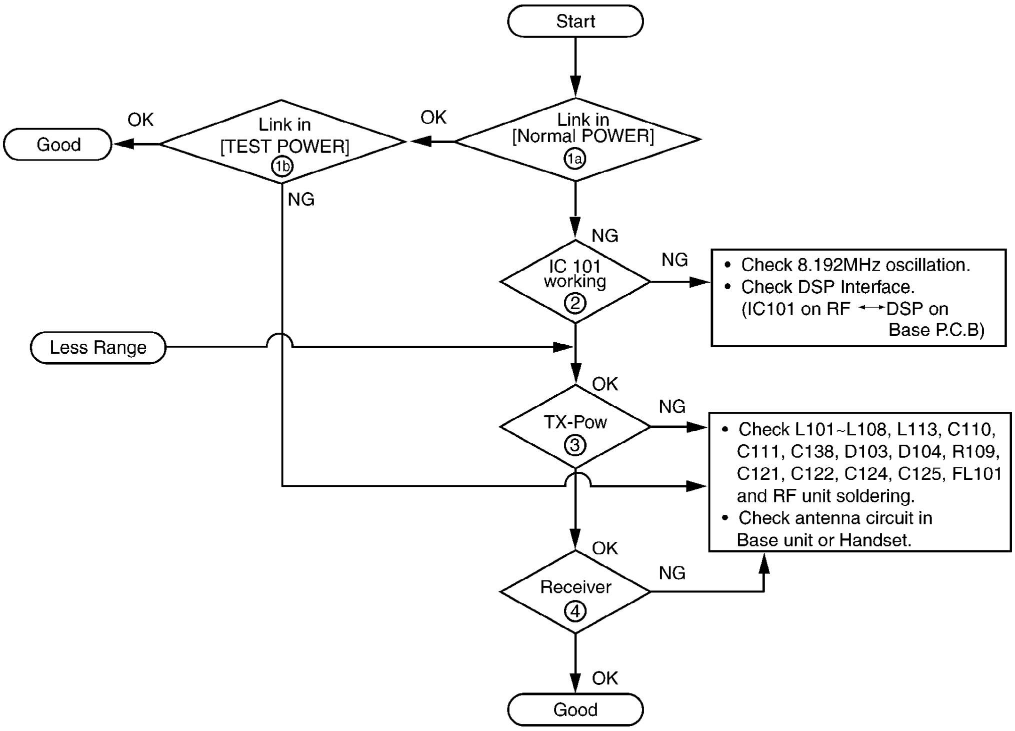

①
"*"
"SP-PHONE"
②
HANDSET
for checking
Power: NORMAL
CH: ?
Power: LOW
CH: 10 CH
REGULAR BASE UNIT

A short beep followed by a long beep is heard. This indicates the unit is in TEST POWER LOW mode. Once in TEST POWER LOW mode, to return the unit to the original NORMAL POWER mode, press 2, 5, 8, 0 simultaneously while the handset unit is in stand-by (not in use, not charging). A long beep is heard. Then disconnect the battery from the handset. Reconnect the battery and place the handset on the cradle to exchange security codes. A single beep is heard.

Note:
You can check the other channels as follows, if need.

Fixation CH	**Figure 1**	
CH	**POWER**	**making key**
1CH	**“LOW“**	**"SP-PHONE" + "1"**
2CH	**“LOW“**	**"SP-PHONE" + "2"**
3CH	**“LOW“**	**"SP-PHONE" + "3"**
4CH	**“LOW“**	**"SP-PHONE" + "4"**
5CH	**“LOW“**	**"SP-PHONE" + "5"**
6CH	**“LOW“**	**"SP-PHONE" + "6"**
7CH	**“LOW“**	**"SP-PHONE" + "7"**
8CH	**“LOW“**	**"SP-PHONE" + "8"**
9CH	**“LOW“**	**"SP-PHONE" + "9"**
10CH	**“LOW”**	**"SP-PHONE" + " ⚹" ← the above case**
11CH	**“LOW“**	**"SP-PHONE" + "0"**
12CH	**“LOW“**	**"SP-PHONE" + "#"**
13CH	**“LOW“**	**"HOLD" + "1"**
14CH	**“LOW“**	**"HOLD" + "2"**
15CH	**“LOW“**	**"HOLD" + "3"**
16CH	**“LOW“**	**"HOLD" + "4"**
17CH	**“LOW“**	**"HOLD" + "5"**
18CH	**“LOW“**	**"HOLD" + "6"**
19CH	**“LOW“**	**"HOLD" + "7"**
20CH	**“LOW“**	**"HOLD" + "8"**
21CH	**“LOW“**	**"HOLD" + "9"**
22CH	**“LOW“**	**"HOLD" + "⚹"**
23CH	**“LOW“**	**"HOLD" + "0"**
24CH	**“LOW“**	**"HOLD" + "#"**
25CH	**“LOW“**	**"OFF" + "⚹"**
26CH	**“LOW“**	**"OFF" + "#"**
1CH	**“NORMAL“**	**"OFF" + "1"**
4CH	**“NORMAL“**	**"OFF" + "2"**
7CH	**“NORMAL“**	**"OFF" + "3"**
10CH	**“NORMAL“**	**"OFF" + "4"**
13CH	**“NORMAL“**	**"OFF" + "5"**
14CH	**“NORMAL“**	**"OFF" + "6"**
17CH	**“NORMAL“**	**"OFF" + "7"**
20CH	**“NORMAL“**	**"OFF" + "8"**
23CH	**“NORMAL“**	**"OFF" + "9"**
26CH	**“NORMAL“**	**"OFF" + "0"**

7.6.16.3. RF Check Flow Chart


Start
Link in
[Normal POWER]
1a
OK
Link in
[TEST POWER]
1b
OK
Good
NG
NG
IC 101
working
2
NG
• Check 8.192MHz oscillation.
• Check DSP Interface.
(IC101 on RF ←→DSP on
Base P.C.B)
Less Range
OK
TX-Pow
3
NG
• Check L101~L108, L113, C110,
C111, C138, D103, D104, R109,
C121, C122, C124, C125, FL101
and RF unit soldering.
• Check antenna circuit in
Base unit or Handset.
OK
Receiver
4
NG
OK
Good

(1a)~ (4): Details of confirmation items are following in "Check Table for RF Block ()".

Note:
DSP is IC501. (for Base Unit)
DSP is IC201. (for Handset)
Both of RF Blocks for Handset and Base Unit are same.

7.6.16.4. Check Table for RF Block

No	Item		BS (Base unit) (*1)	HS (Handset) (*1
1a.	Link confirmation [NORMAL POWER]	Procedure	1. Put "HS (working)" on BS. 2. Set MODE to [NORMAL POWER] of "HS (working)". 3. Press [TALK] key of "HS (working)" to establish link.	1. Put HS on "BS (working)". 2. Set MODE to [NORMAL POWER] o (working)". 3. Press [TALK] key of "HS" to estab
1b.	Link confirmation [TEST POWER] for confirmation the sensitivity of RF Block	Procedure	1. Change MODE to [TEST POWER] of "HS (working)". 2. Press [TALK] key of "HS (working)" to establish link. 3. Confirm the suspicious BS links to HS (working) with approximately the same distance from BS (working).	1. Change MODE to [TEST POWER] (working)". 2. Press [TALK] key of "HS" to estab 3. Confirm the suspicious HS links t (working) with approximately the sa from HS (working).
2	IC101 working confirmation	Procedure	1. Set Test-mode Just entering to test mode.(*3) 2. Confirm oscillate signal of RF UNIT (8.192 MHz at OSC). (*5)	1. Set Test-mode Just entering to te 2. Confirm oscillate signal of RF UNI at OSC). (*6)
		Check point	1. Check Xtal oscillator at Q260 - C of the base unit. 2. Check DSP interface(IC101 ←→ DSP/BS) (*4).	1. Check Xtal oscillator at Q204 - C c handset. 2. Check DSP interface(IC101 ←

No	Item		BS (Base unit) (*1)	HS (Handset) (*1
3	TX Power confirmation	Procedure	1. Put RF wire to ANT and ANT_GND (See Cordless Base Board Reference Drawing). Connect this wire to the Spectrum Analyzer. 2. Set Test-mode. (*7) 3. Confirm TX power level within +11±5dBm (*2)	1. Put RF wire to ANT and ANT_GND Handset Reference Drawing). Connect this wire to the Spectrum A 2. Set Test-mode. (*8) 3. Confirm TX power level within +11
		Check point	1. Check L101 ~ L108, L113, C110, C111, C138, D103, D104, R109, C121, C122, C124, C125, FL101 soldering. 2. Check Antenna in BS.	1. Check L101 ~ L108, L113, C110, C D103, D104, R109, C121, C122, C124 FL101 soldering. 2. Check Antenna in HS.
4	Receiver confirmation	Procedure	1. Put “HS (working)” on BS. 2. Set MODE to [NORMAL POWER] of “HS (working)”. 3. Press [TALK] key of “HS (working)“ to establish link. 4. Change MODE to [TEST POWER] of “HS (working)“. 5. Press [TALK] key of “HS (working)” to establish link. Confirm the suspicious BS links to HS (working) with approximately the same distance from BS (working).	1. Put HS on “BS (working)”. 2. Set MODE to [NORMAL POWER] (working)”. 3. Press [TALK] key of “HS” to estab 4. Change MODE to [TEST POWER] (working)”. 5. Press [TALK] key of “HS” to estab Confirm the suspicious HS links to with approximately the same distan (working).
		Check point	1. Check C115, C114, L111, C118 soldering. 2. Check Antenna in BS.	1. Check C115, C114, L111, C118 sol 2. Check Antenna in HS.

Note:
DSP is IC501 (for Cordless Base Board)
DSP is IC201 (for Handset Board)

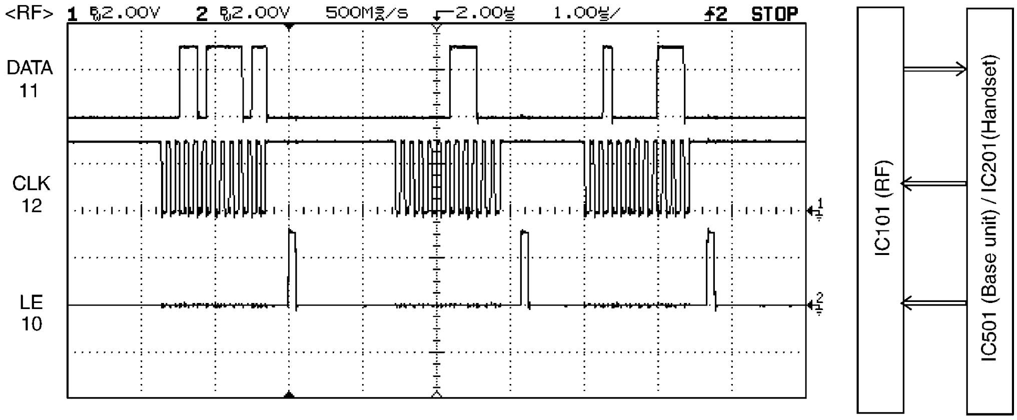
(1*) BS : Base unit which is checked.
HS : Handset unit which is checked.
BS (working) : Base unit which is working.
HS (working) : Handset unit which is working.
(*2)<Spectrum analyzer setting>
SPAN: 10MHz
VBW, RBW: 1MHz
SWEEP: 1sec.

(*3)See Test Mode Flow Chart for Cordless Base Board ( ).
(*4)See RF-DSP Interface Signal Wave Form ().
See CORDLESS BASE BOARD (PCB5) ().
See HANDSET BOARD (PCB6) ().
(*5)See Cordless Base Board Reference Drawing ().
(*6) see Handset Reference Drawing ()
(*7) see Test Mode Flow Chart for Cordless Base Board ()
(*8) see Test Mode Flow Chart for Handset ()

7.6.16.5. RF-DSP Interface Signal Wave Form

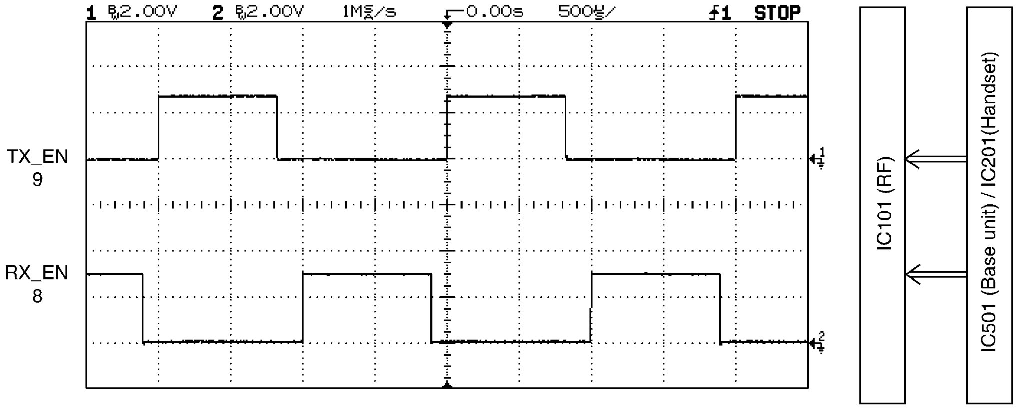
(1) Serial control line <Standby mode>

<Standby mode>

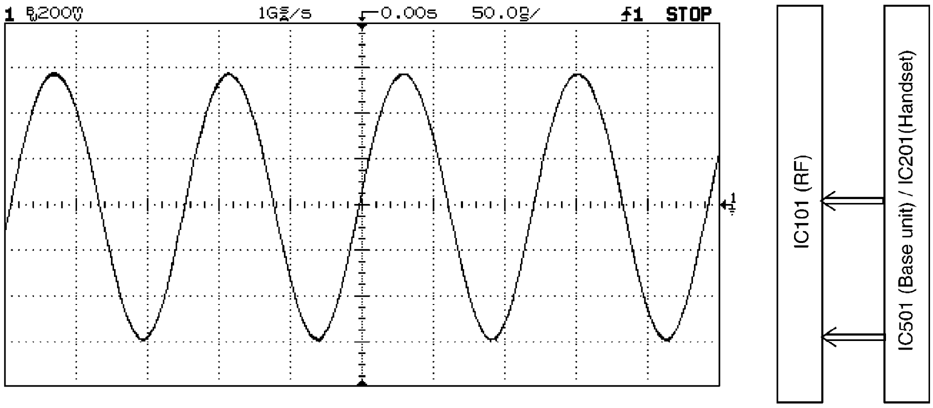


(2) Control line <Talk mode>

<Tx & Rx Power SW>



<Reference clock 8.192MHz>



8. ADJUSTMENT

8.1. ADJUSTMENT BATTERY LOW DETECTOR VOLTAGE

After replacing handset’s DSP (IC201), Re-writing Battery Low voltage to EEPROM is required.

<How to re-write>

1. Set 3.9V for DC power supply.

2. Enter the test mode (Refer to Test Mode Flow Chart for Handset ())

3. Follow to "Batt Low Check" mode......... (CW Tx High is displayed on LCD)

4. Set 3.5V for DC power supply.

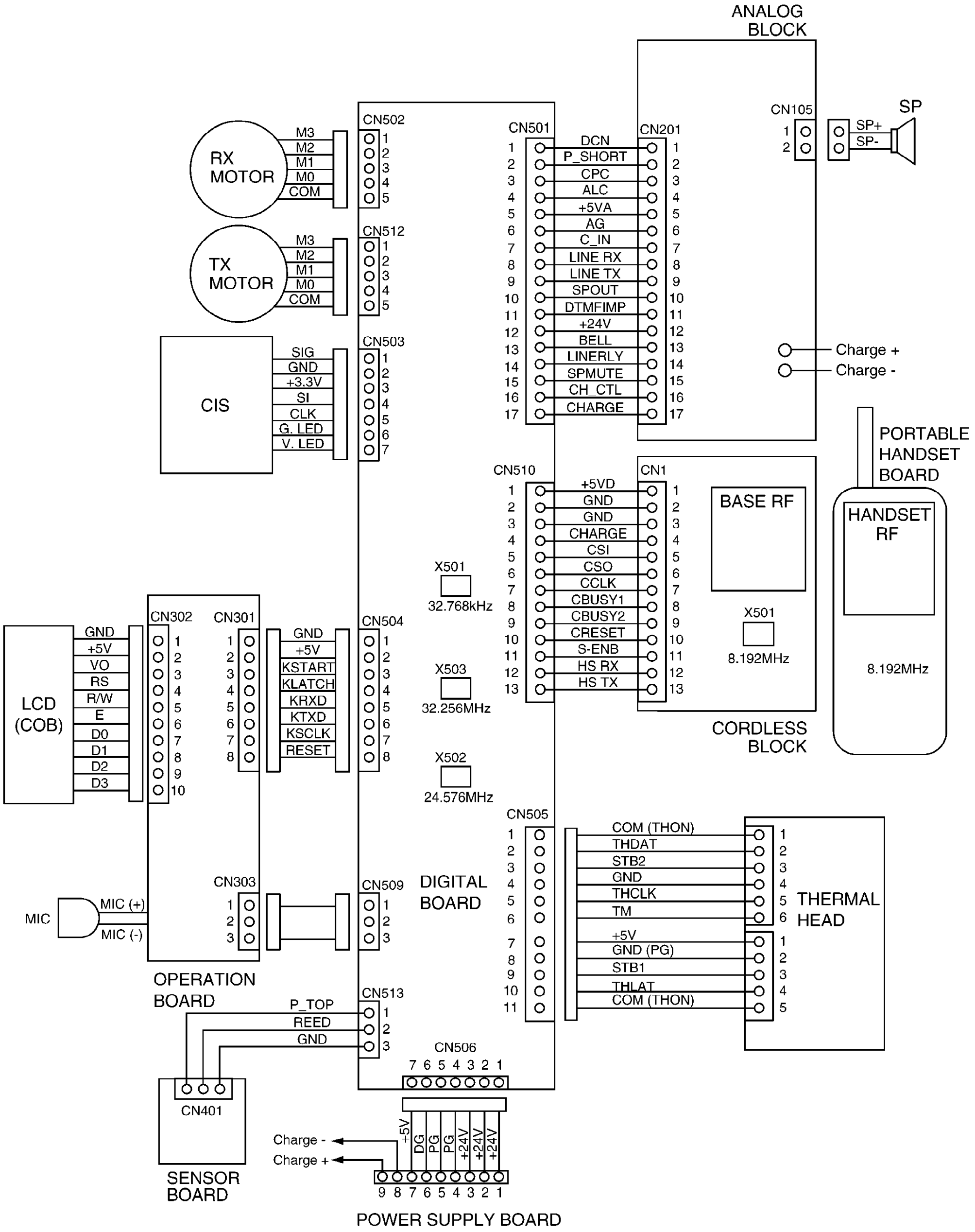
Note: Check voltage at battery connector, because some voltage drop is happened, using long or thin cable.

5. Press "#" key to write voltage value in EEPROM.

6. Turn power off. Then this value is available.

9. CIRCUIT OPERATIONS

9.1. CONNECTION DIAGRAM


ANALOG BLOCK
CN105
SP
SP+
SP-
RX MOTOR
M3
M2
M1
M0
COM
CN502
TX MOTOR
CN512
CIS
SIG
GND
+3.3V
SI
CLK
G. LED
V. LED
CN503
CN501
CN201
DCN
P_SHORT
CPC
ALC
+5VA
AG
C_IN
LINE RX
LINE TX
SPOUT
DTMFIMP
+24V
BELL
LINERLY
SPMUTE
CH_CTL
CHARGE
Charge +
Charge -
PORTABLE HANDSET BOARD
HANDSET RF
8.192MHz
CN510
CN1
+5VD
GND
CHARGE
CSI
CSO
CCLK
CBUSY1
CBUSY2
CRESET
S-ENB
HS RX
HS TX
BASE RF
X501
8.192MHz
CORDLESS BLOCK
X501
32.768kHz
X503
32.256MHz
X502
24.576MHz
LCD (COB)
+5V
VO
RS
R/W
E
D0
D1
D2
D3
CN302
CN301
KSTART
KLATCH
KRXD
KTXD
KSCLK
RESET
CN504
MIC
MIC (+)
MIC (-)
CN303
OPERATION BOARD
CN509
DIGITAL BOARD
CN505
COM (THON)
THDAT
STB2
THCLK
TM
GND (PG)
STB1
THLAT
THERMAL HEAD
CN513
P_TOP
REED
CN401
SENSOR BOARD
CN506
+5V
DG
PG
+24V
POWER SUPPLY BOARD

9.2. GENERAL BLOCK DIAGRAM

The following is an outline of each device IC on the digital board. (Refer to General Block Diagram().).

1. ASIC (IC501)

Composed mainly of an address decoder and a modem control.

Controls the general FAX operations.

Controls the operation panel I/F.

Controls the thermal head I/F and CIS I/F.

Performs the image processing.
CPU and Real time clock

2. **Flash ROM (IC502)**
   Contains all of the program instructions on the unit operations.
   This memory is used mainly for the parameter working in the storage area.

3. **Dynamic RAM (IC503)**
   This memory is used mainly for the parameter working in the storage area.

4. **MODEM (IC505)**
   Performs the modulation and the demodulation for FAX communication.

5. **Read Section**
   CIS image sensor to read transmitted documents.

6. **Motor Driver (IC508, IC509)**
   Drives the transmission motor and the reception motor.

7. **Thermal Head**
   Contains heat-emitting elements for dot matrix image printing.

8. **Analog Board**
   Composed of ITS circuit and NCU circuit.

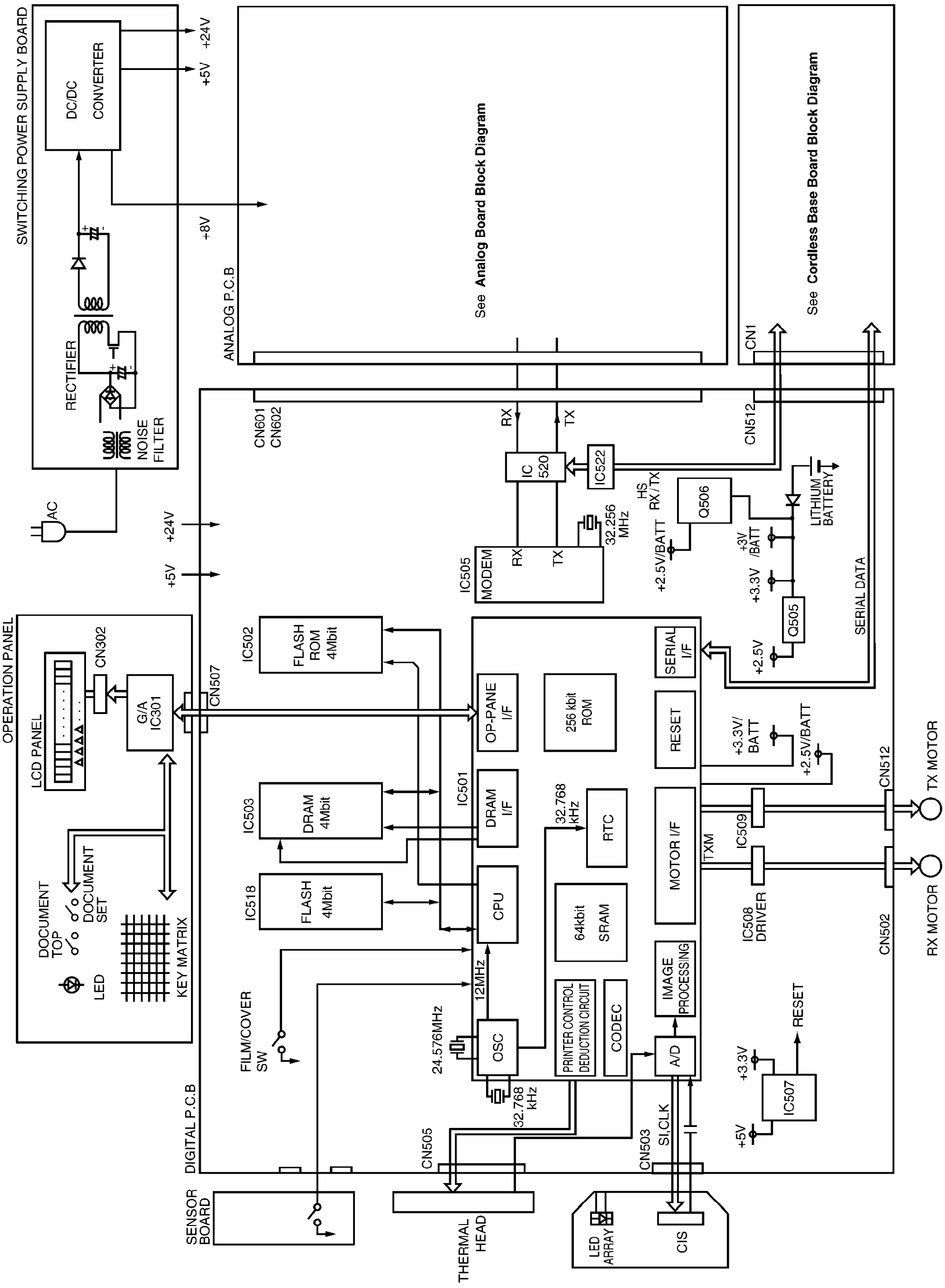
9. **Sensor Section**
   Composed of a cover open and film end switch, a document set switch, a document top switch, a paper top sensor.

10. **Power Supply Board Switching Section**
    Supplies +5V, +8V and +24V to the unit.

11. **Flash Memory (IC518)**
    This memory is used for voice prompt.

12. **Gate Array (IC523)**
    General purpose Input/Output port.

9.2.1. General Block Diagram


SWITCHING POWER SUPPLY BOARD
DC/DC CONVERTER
RECTIFIER
NOISE FILTER
AC
+24V
+5V
+8V
ANALOG P.C.B
See Analog Board Block Diagram
See Cordless Base Board Block Diagram
CN1
CN601
CN602
CN512
RX
TX
IC 520
IC522
IC505
MODEM
32.256 MHz
HS RX / TX
Q506
+2.5V/BATT
+3V /BATT
+3.3V
LITHIUM BATTERY
Q505
+2.5V
SERIAL DATA
OPERATION PANEL
LCD PANEL
CN302
G/A IC301
CN507
IC502
FLASH ROM 4Mbit
OP-PANE I/F
256 kbit ROM
SERIAL I/F
RESET
+3.3V/ BATT
+2.5V/BATT
IC501
IC503
DRAM 4Mbit
DRAM I/F
32.768 kHz
RTC
MOTOR I/F
TXM
IC509
CN512
TX MOTOR
DOCUMENT TOP
DOCUMENT SET
LED
KEY MATRIX
IC518
FLASH 4Mbit
CPU
64kbit SRAM
IC508 DRIVER
RX MOTOR
CN502
12MHz
IMAGE PROCESSING
24.576MHz
OSC
PRINTER CONTROL DEDUCTION CIRCUIT
CODEC
A/D
RESET
FILM/COVER SW
32.768 kHz
+3.3V
+5V
IC507
DIGITAL P.C.B
CN505
CN503
SI.CLK
SENSOR BOARD
THERMAL HEAD
LED ARRAY
CIS

CROSS REFERENCE:

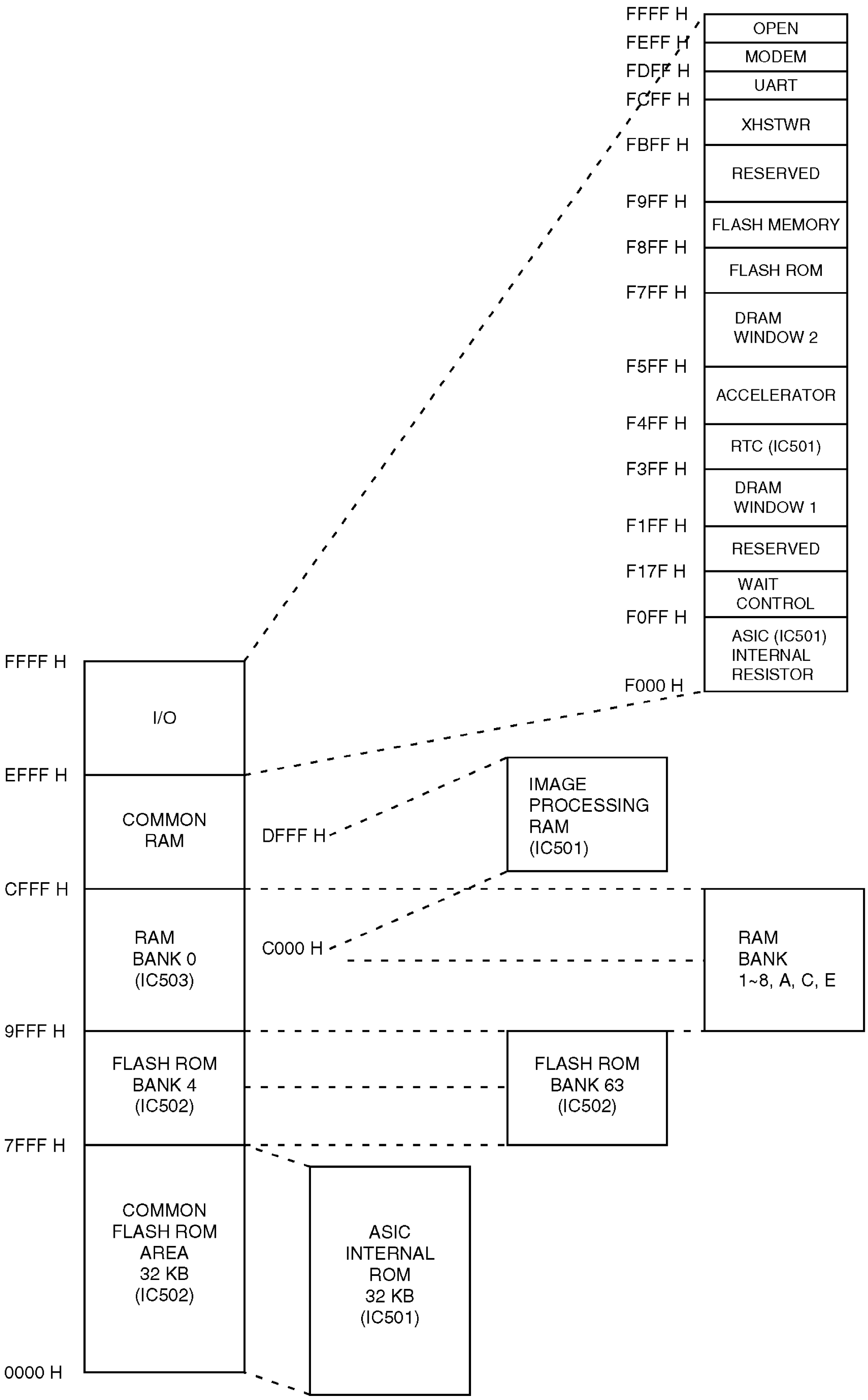
Analog Board Block Diagram ()

Cordless Base Board Block Diagram ()

9.3. CONTROL SECTION

9.3.1. Block Diagram

9.3.2. Memory Map


FFFF H
FEFF H
FDFF H
FCFF H
FBFF H
F9FF H
F8FF H
F7FF H
F5FF H
F4FF H
F3FF H
F1FF H
F17F H
F0FF H
F000 H
OPEN
MODEM
UART
XHSTWR
RESERVED
FLASH MEMORY
FLASH ROM
DRAM WINDOW 2
ACCELERATOR
RTC (IC501)
DRAM WINDOW 1
RESERVED
WAIT CONTROL
ASIC (IC501) INTERNAL RESISTOR
FFFF H
EFFF H
CFFF H
9FFF H
7FFF H
0000 H
I/O
COMMON RAM
RAM BANK 0 (IC503)
FLASH ROM BANK 4 (IC502)
COMMON FLASH ROM AREA 32 KB (IC502)
DFFF H
C000 H
IMAGE PROCESSING RAM (IC501)
RAM BANK 1~8, A, C, E
FLASH ROM BANK 63 (IC502)
ASIC INTERNAL ROM 32 KB (IC501)

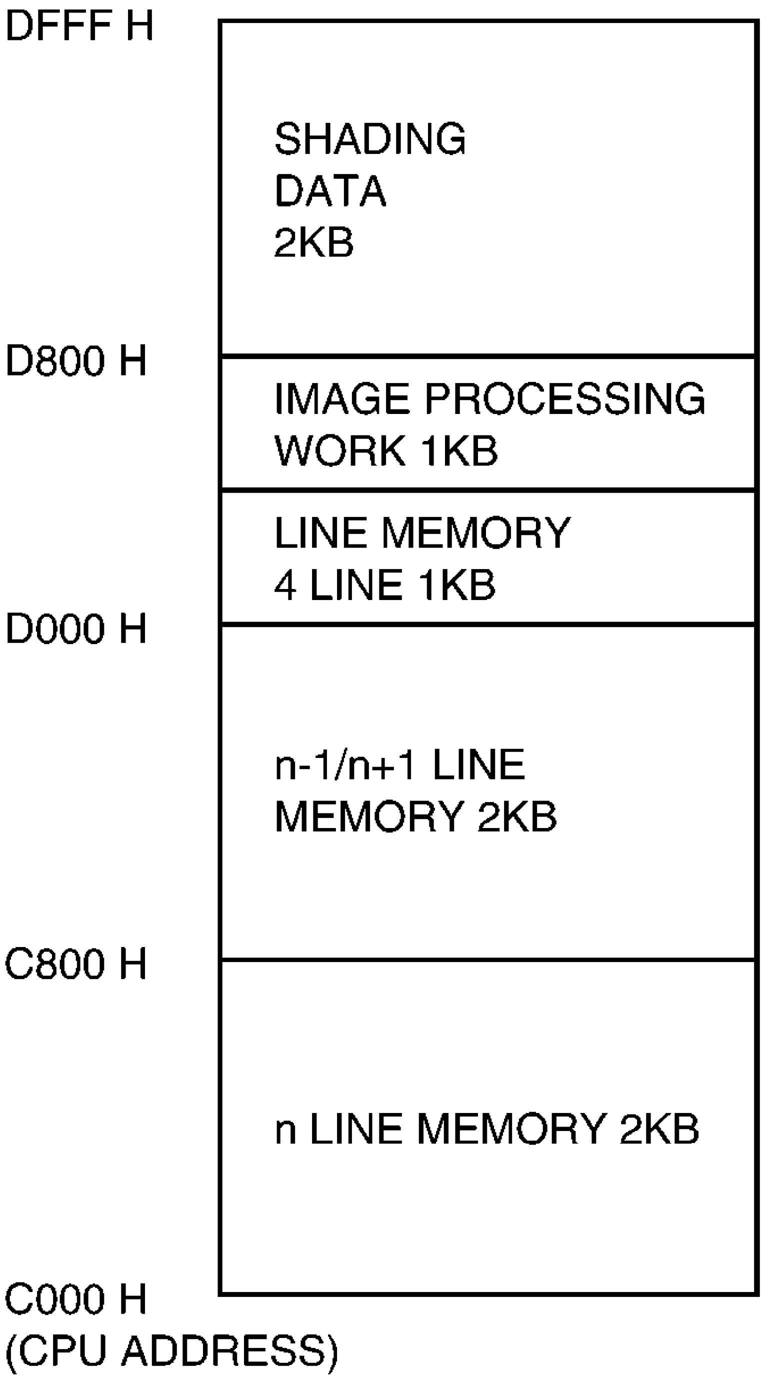
9.3.3. ASIC (IC501)

This custom IC is used for the general FAX operations.

1. CPU:

This model uses a Z80 equivalent to the CPU operating at 12 MHz. Most of the peripheral functions are performed by custom-designed LSIs. Therefore, the CPU only works for processing the results.

2. **RTC:**
   Real Time Clock
3. **DECODER:**
   Decodes the address.
4. **ROM/RAM I/F:**
   Controls the SELECT signal of ROM or RAM and the bank switching.
5. **CIS I/F:**
   Controls the document reading.
6. **IMAGE DATA RAM:**
   This memory is programmed into the ASIC and uses 8 KB for the image processing. (See Fig. A.*)
7. **THERMAL HEAD I/F:**
   Transmits the recorded data to the thermal head.
8. **MOTOR I/F:**
   Controls the transmission motor which feeds the document.
   Controls the receiving motor which feeds the recording paper.
9. **OPERATION PANEL I/F:**
   Serial interface with Operation Panel.
10. **I/O PORT:**
    I/O Port Interface.
11. **ANALOG UNIT:**
    Electronic volume for the handset and the monitor.
    Sends beep tones, etc.


DFFF H
SHADING
DATA
2KB
D800 H
IMAGE PROCESSING
WORK 1KB
LINE MEMORY
4 LINE 1KB
D000 H
n-1/n+1 LINE
MEMORY 2KB
C800 H
n LINE MEMORY 2KB
C000 H
(CPU ADDRESS)

Note*:

This memory is incorporated into the ASIC (IC501) and used for the image processing.

Fig. A shows the memory map of the Image Data RAM.

9.3.4. Flash ROM (IC502)

The 512KB ROM (FLASH ROM) carries a common area of 32KB and bank areas which each have 8KB (BK4~BK63). The addresses from 0000H to 7FFFH are for the common area and from 8000H to 9FFFH are for the bank areas.

9.3.5. Dynamic RAM (IC503)

The DRAM serves as CPU and receives memory.
The address is F200H~F3FFH (DRAM access window 1) and F600H~F7FFH (DRAM access window 2).

Descriptions of Pin Distribution (IC501)

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
1	VSSA		GND	POWER SOURCE (ANALOG GND)
2	VDDA 3.3		3.3V	POWER SOURCE (ANALOG +3.3V)
3	AIN1	A	3.3V	CCD IMAGE SIGNAL INPUT
4	AIN2	A	3.3V	THERMISTOR TEMPERATURE WATC INPUT
5	AIN3	A	3.3V	-----------
6	AMON	A	3.3V	ANALOG SIGNAL MONITOR TERMIN
7	VSS		GND	POWER SOURCE (GND)
8	X32OUT	O	3.3V/BATT	RTC (32.768KHz) CONNECTION
9	X32IN	I	3.3V/BATT	RTC (32.768KHz) CONNECTION
10	VDD (3.3V / B)		-----	POWER SOURCE (+3.3V/LITHIUM BATTERY)
11	XBACEN	I	3.3V/BATT	BACKUP ENABLE
12	XRAMCS	O	3.3V/BATT	NOT USED
13	VDD (3.3V / B)		-----	POWER SOURCE(+3.3V / LITHIUM BATTERY)
14	VDD (2.5V/B)		-----	POWER SOURCE (+2.5V / LITHIUM BATTERY)
15	FTG	O	3.3V	SH SIGNAL OUTPUT FOR CIS (SI)
16	F1	O	3.3V	01 SIGNAL OUTPUT FOR CIS (CLK)
17	F2/OP	O	3.3V	OUTPUT PORT (THON)
18	FR/OP	O	3.3V	OUTPUT PORT (MDMRST)
19	CPC	I	3.3V	INPUT PORT (CPC)
20	RVN	I	3.3V	INPUT PORT (REED)
21	IRDATXD/IOP	O	3.3V	OUTPUT PORT (CISLED)
22	IRDARXD/IOP80	I	3.3V	INPUT PORT (CSI)
23	TXD/IOP	I	3.3V	INPUT PORT (FILMEND)
24	RXD/IOP	O	3.3V	OUTPUT PORT (LINE RLY)
25	XRTS/IOP	I	3.3V	INPUT PORT (BELL)
26	XCTS/IOP	O	3.3V	OUTPUT PORT (SPMUTE)

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
27	VDD (2.5V)		-----	POWER SOURCE (+2.5V)
28	TONE1	A	3.3V	TONE OUTPUT
29	TONE2	A	3.3V	TONE OUTPUT
30	VOLUREF	A	3.3V	ANALOG REF VOLTAGE
31	VOLUOUT	A	3.3V	VOLUME OUTPUT
32	VOLUIN	A	3.3V	VOLUME INPUT
33	XNMI	I	3.3V	HIGH FIXED
34	FMEMDO/IOP	O	3.3V	OUTPUT PORT (CBUSY2)
35	VDD (3.3V)		-----	POWER SOURCE (+3.3V)
36	VSS		GND	POWER SOURCE (GND)
37	VSS		GND	POWER SOURCE (GND)
38	VDD (3.3V)		-----	POWER SOURCE (+3.3V)
39	MIDAT/IOP	O	3.3V	-----------
40	MICLK/IOP	O	3.3V	-----------
41	MILAT/IOP	O	3.3V	-----------
42	20KOSC/IOP	O	3.3V	OUTPUT PORT (CSO)
43	XWAIT	I	3.3V	INPUT PORT (CHG)
44	HSTRD/IOP	O	3.3V	-----------
45	HSTWR/IOP	O	3.3V	OUTPUT PORT (OPRESET)
46	XOPRBE	O	3.3V	MFCS
47	ADR15	O	3.3V	CPU ADDRESS BUS 15
48	ADR14	O	3.3V	CPU ADDRESS BUS 14
49	ADR13	O	3.3V	CPU ADDRESS BUS 13
50	VDD (2.5V)		-----	POWER SOURCE (+2.5V)
51	XOUT	O	3.3V	SYSTEM CLOCK (24.576MHz)
52	XIN	I	3.3V	SYSTEM CLOCK (24.576MHz)
53	VSS		GND	POWER SOURCE (GND)
54	VDD (3.3V)		-----	POWER SOURCE (+3.3V)
55	XTEST	O	3.3V	24.576MHz CLOCK
56	TEST1	I	3.3V	HIGH FIXED
57	TEST2	I	3.3V	HIGH FIXED
58	TEST3	I	3.3V	HIGH FIXED
59	TEST4	I	3.3V	HIGH FIXED
60	XMDMINT	I	3.3V	MODEM INTERRUPT
61	XMDMCS	O	3.3V	MODEM CHIP SELECT
62	XRAS/IOP	O	3.3V	DRAM (IC503) ROW ADDRESS STRO
63	XCAS1/IOP	O	3.3V	DRAM (IC503) CULUM ADDRESS STROBE
64	XCAS2/IOP	O	3.3V	OUTPUT PORT (S_ENB)
65	XRESCS2	O	3.3V	IC518 CHIP SELECT

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
66	DB3	I/O	3.3V	CPU DATA BUS 3
67	DB2	I/O	3.3V	CPU DATA BUS 2
68	DB4	I/O	3.3V	CPU DATA BUS 4
69	DB1	I/O	3.3V	CPU DATA BUS 1
70	DB5	I/O	3.3V	CPU DATA BUS 5
71	VDD (3.3V)		-----	POWER SOURCE (+3.3V)
72	VSS		GND	POWER SOURCE (GND)
73	VSS		GND	POWER SOURCE (GND)
74	VDD (3.3V)		-----	POWER SOURCE (+3.3V)
75	DB0	I/O	3.3V	CPU DATA BUS 0
76	DB6	I/O	3.3V	CPU DATA BUS 6
77	DB7	I/O	3.3V	CPU DATA BUS 7
78	XROMCS	O	3.3V	ROM (IC502) CHIP SELECT
79	RD	O	3.3V	CPU RD
80	WR	O	3.3V	CPU WR
81	ADR0	O	3.3V	CPU ADDRESS BUS 0
82	ADR1	O	3.3V	CPU ADDRESS BUS 1
83	ADR2	O	3.3V	CPU ADDRESS BUS 2
84	ADR3	O	3.3V	CPU ADDRESS BUS 3
85	ADR4	O	3.3V	CPU ADDRESS BUS 4
86	ADR5	O	3.3V	CPU ADDRESS BUS 5
87	VSS		GND	POWER SOURCE (GND)
88	VDD (2.5V)		-----	POWER SOURCE (+2.5V)
89	ADR6	O	3.3V	CPU ADDRESS BUS 6
90	ADR7	O	3.3V	CPU ADDRESS BUS 7
91	ADR8	O	3.3V	CPU ADDRESS BUS 8
92	ADR9	O	3.3V	CPU ADDRESS 9
93	ADR10	O	3.3V	CPU ADDRESS 10
94	ADR11	O	3.3V	CPU ADDRESS 11
95	ADR12	O	3.3V	CPU ADDRESS 12
96	RBA0	O	3.3V	ROM/RAM BANK ADDRESS 0
97	RBA1	O	3.3V	ROM/RAM BANK ADDRESS 1
98	RBA2	O	3.3V	ROM/RAM BANK ADDRESS 2
99	RBA3	O	3.3V	ROM/RAM BANK ADDRESS 3
100	RBA4	O	3.3V	ROM/RAM BANK ADDRESS 4
101	RBA5	O	3.3V	ROM/RAM BANK ADDRESS 5
102	RBA6/IOP96	O	3.3V	A19
103	STB1	O	3.3V	STROBE SIGNAL OUTPUT TO THER HEAD
104	STB2	O	3.3V	STROBE SIGNAL OUTPUT TO THER HEAD

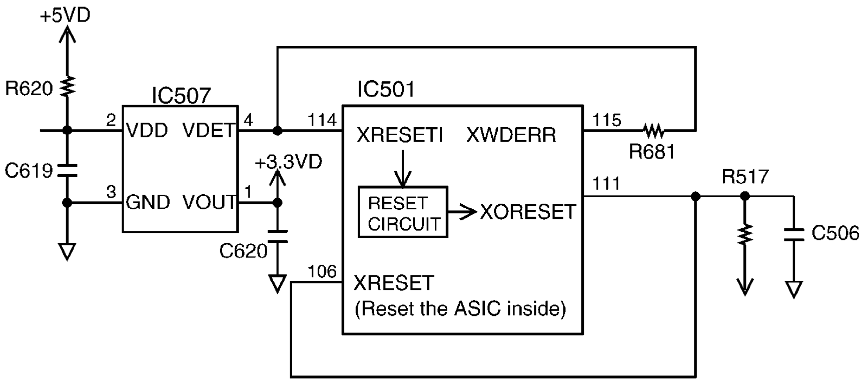
NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
105	STB3	O	3.3V	NOT USED
106	XRESET	I	3.3V	RESET INPUT
107	VDD (3.3V)		-----	POWER SOURCE (+3.3V)
108	VSS		GND	POWER SOURCE (GND)
109	VSS		GND	POWER SOURCE (GND)
110	VDD (3.3V)		-----	POWER SOURCE (+3.3V)
111	XORESET	O	3.3V	RESET OUTPUT
112	VDD(5V)		-----	POWER SOURCE (+5V)
113	VSS		GND	POWER SOURCE (GND)
114	XRESETI	I	3.3V	RESET INPUT
115	WDERR	O	3.3V	WATCHED ERROR OUTPUT SIGNAL
116	THDAT	O	3.3V	RECORDED IMAGE OUTPUT
117	THCLK	O	3.3V	CLOCK OUTPUT FOR DATA TRANSF
118	THLAT	O	3.3V	PULSE OUTPUT FOR DATA LATCH
119	STBNP	I	3.3V	INPUT PORT (TEST)
120	RM0/IOP	O	3.3V	MOTOR A PHASE
121	RM1/IOP	O	3.3V	MOTOR B PHASE
122	RM2/IOP	O	3.3V	MOTOR /A PHASE
123	RM3/IOP	O	3.3V	MOTOR /B PHASE
124	RXE/IOP	O	3.3V	MOTOR ENABLE SIGNAL
125	TMO	O	3.3V	MOTOR A PHASE
126	VDD (2.5V)		-----	POWER SOURCE (+2.5V)
127	VSS		GND	POWER SOURCE (GND)
128	TM1/IOP	O	3.3V	MOTOR B PHASE
129	TM2/IOP	O	3.3V	MOTOR /A PHASE
130	TM3/IOP	O	3.3V	MOTOR /B PHASE
131	TXE/IOP	O	3.3V	MOTOR ENABLE SIGNAL
132	KSTART	O	3.3V	OPERATION PANEL CONTROL
133	KLATCH	O	3.3V	OPERATION PANEL CONTROL
134	KSCLK	O	3.3V	OPERATION PANEL CONTROL
135	KTXD	O	3.3V	OPERATION PANEL CONTROL
136	KRXD	I	3.3V	OPERATION PANEL CONTROL
137	FMEMCLK/IOP	I	3.3V	INPUT PORT (CCLK)
138	FMEMDI/IOP	I	3.3V	INPUT PORT (CBUSY1)
139	ADSEL1	O	3.3V	CHANNEL SELECT SIGNAL FOR AIN
140	VDDA (2.5V)		2.5V	POWER SOURCE (ANALOG +2.5V)
141	VREFB	A	3.3V	A/D CONVERTER'S ZERO STANDAR VOLTAGE OUTPUT
142	VCL	A	3.3V	ANALOG PART STANDARD VOLTAG SIGNAL

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
143	VREFT	A	3.3V	A/D CONVERTER'S FULL SCALE VOLTAGE OUTPUT
144	VSSA		GND	POWER SOURCE (ANALOG GND)

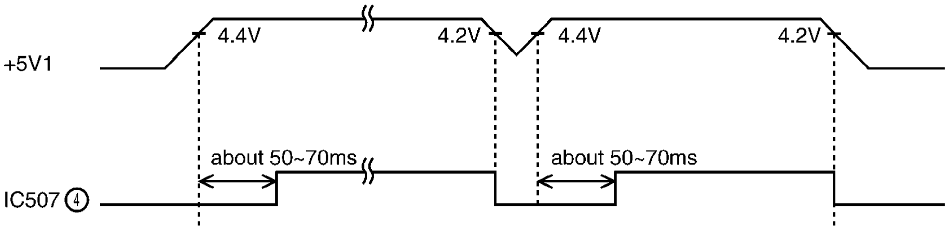
9.3.6. Reset Circuit (Watch dog timer)

The output signal (reset) from pin 4 of the voltage detect IC (IC507) is input to the ASIC (IC501) 114 pin.

Circuit Diagram


+5VD
R620
C619
IC507
2
VDD
VDET
4
3
GND
VOUT
1
+3.3VD
C620
IC501
114
XRESETI
XWDERR
115
R681
RESET CIRCUIT
XORESET
111
R517
C506
106
XRESET
(Reset the ASIC inside)

1. **During a momentary power interruption, a reset pulse of 50~70 msec is generated and the system is reset completely.**


+5V1
4.4V
4.2V
4.4V
4.2V
about 50~70ms
about 50~70ms
IC507 ④

2. **The watch dog timer, built-in the ASIC (IC501), is initialized by the CPU about every 1.5 ms.**
   When a watch dog error occurs, pin 115 of the ASIC (IC501) becomes low level.
   The terminal of the 'WDERR' signal is connected to the reset line, so the 'WDERR' signal works as the reset signal.

9.3.7. RTC Backup Circuit

1. Function

This unit has a lithium battery (BAT501) which works for Real Time Clock IC (RTC: inside IC501).

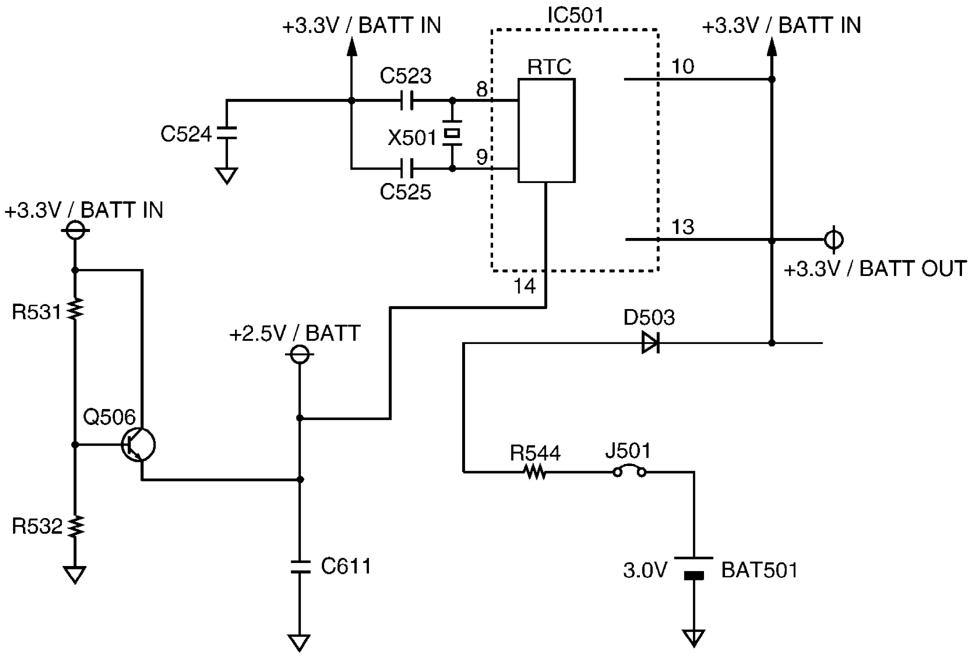
The RTC continues to work, backed up by a lithium battery even when the power switch is OFF.

The user parameters for autodial numbers, the system setup data and others are in the FLASH MEMORY (IC502).

2. RTC Inside (IC501) Backup Circuit Operation

When the power switch is turned ON, power is supplied through Q506 to the RTC (inside IC501). At this time, the voltage at pin 14 of the IC501 is +2.5V. When the power switch is turned OFF, the BAT501 supplies power to RTC through D503 and Q506. The voltage at pin 14 of IC501 is about +2.2V. When the power switch is OFF and the voltage of +3.3V decreases, pin 14 of RTC (IC501) becomes roughly the same voltage as the battery voltage. RTC goes into the backup mode, in which the power consumption is lower.

Circuit Diagram


+3.3V / BATT IN
IC501
+3.3V / BATT IN
RTC
C523
8
10
C524
X501
9
C525
+3.3V / BATT IN
13
+3.3V / BATT OUT
14
R531
+2.5V / BATT
D503
Q506
R544
J501
R532
C611
3.0V
BAT501

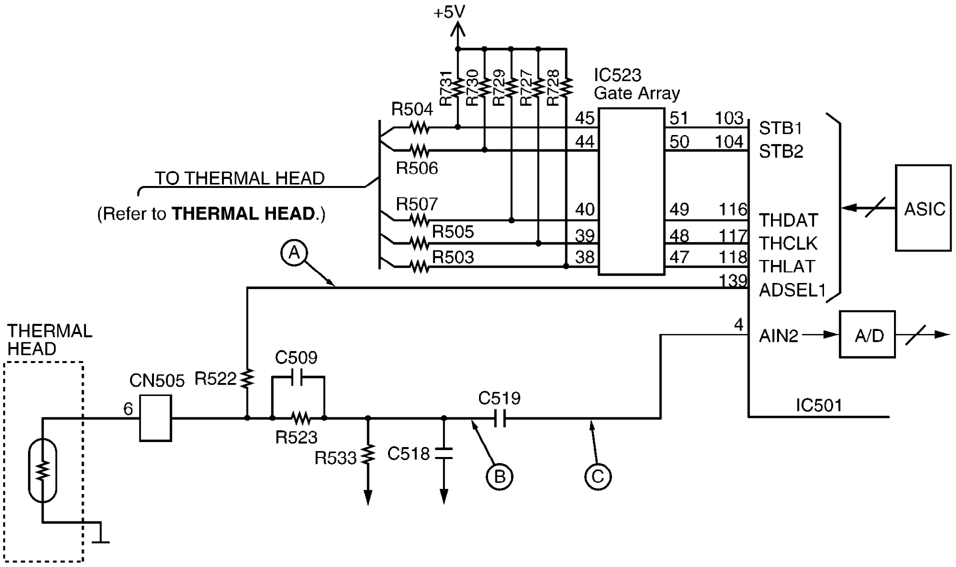
9.3.8. Supervision Circuit for the Thermal Head Temperature

1. Function

The thermistor changes the resistor according to the temperature and uses the thermistor's characteristics. The output of pin 137 of IC501 becomes a low level. Then when it becomes a high level, it triggers point A In point C, according to the voltage output time, the thermal head's temperature is detected.

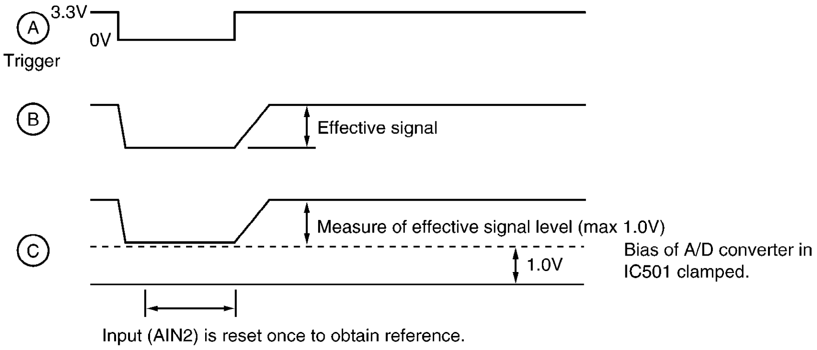
After the thermal head temperature is converted to voltage in B, it is then changed to digital data in the A/D converter inside IC501. The CPU decides the strobe width of the thermal head according to this value. Therefore, this circuit can keep the thermal head at an even temperature in order to stabilize the printing density and prevent the head from being overheated.

Circuit Diagram



+5V
R731
R730
R729
R727
R728
IC523
Gate Array
R504
R506
R507
R505
R503
45
44
40
39
38
51
50
49
48
47
103
104
116
117
118
139
STB1
STB2
THDAT
THCLK
THLAT
ADSEL1
ASIC
TO THERMAL HEAD
(Refer to THERMAL HEAD.)
A
THERMAL HEAD
CN505
6
R522
C509
R523
R533
C518
C519
B
C
4
AIN2
A/D
IC501

Timing Chart



A
3.3V
0V
Trigger
B
Effective signal
C
Measure of effective signal level (max 1.0V)
1.0V
Bias of A/D converter in IC501 clamped.
Input (AIN2) is reset once to obtain reference.

CROSS REFERENCE:

Thermal Head()

9.4. FACSIMILE SECTION

9.4.1. Image Data Flow during facsimile Operation

Copy (Fine, Super-Fine, Half Tone)

1. **Line information is read by CIS (to be used as the reference white level) via route1, and is input to IC501. Refer to Block Diagram()**
2. **In IC501, the data is adjusted to a suitable level for A/D conversion in the Analog Signal Processing Section, and via route2 it is input to A/D conversion (8 bit). After finishing A/D conversion, the data is input to the Image Processing Section via route3. Then via route4 and route5, it is stored in RAM as shading data.**
3. **The draft's information that is read by CIS is input to IC501 via route1. After it is adjusted to a suitable level for A/D conversion via route2, the draft's information is converted to A/D (8 bit), and it is input to the Image Processing Section. The other side, the shading data which flows from RAM via route6 and route7, is input to the Image Processing Section. After finishing the draft's information image processing, white is regarded as "0" and black is regarded as "1". Then via routes4 and 5, they are stored in RAM.**
4. **The white/black data stored as above via routes6 and 8 is input to the P/S converter. The white/black data converted to serial data in the P/S converter is input to the Thermal Head via route9 and is printed out on recording paper.**

Note:
Standard : Reads 3.85 times/mm
Fine : Reads 7.7 times/mm
Super-Fine : Reads 15.4 times/mm

Transmission

1. **Same processing as Copy items 1 - 3.**
2. **The data stored in the RAM of IC501 is output from IC501 via routes6 and 10, and is stored in the system bus.**

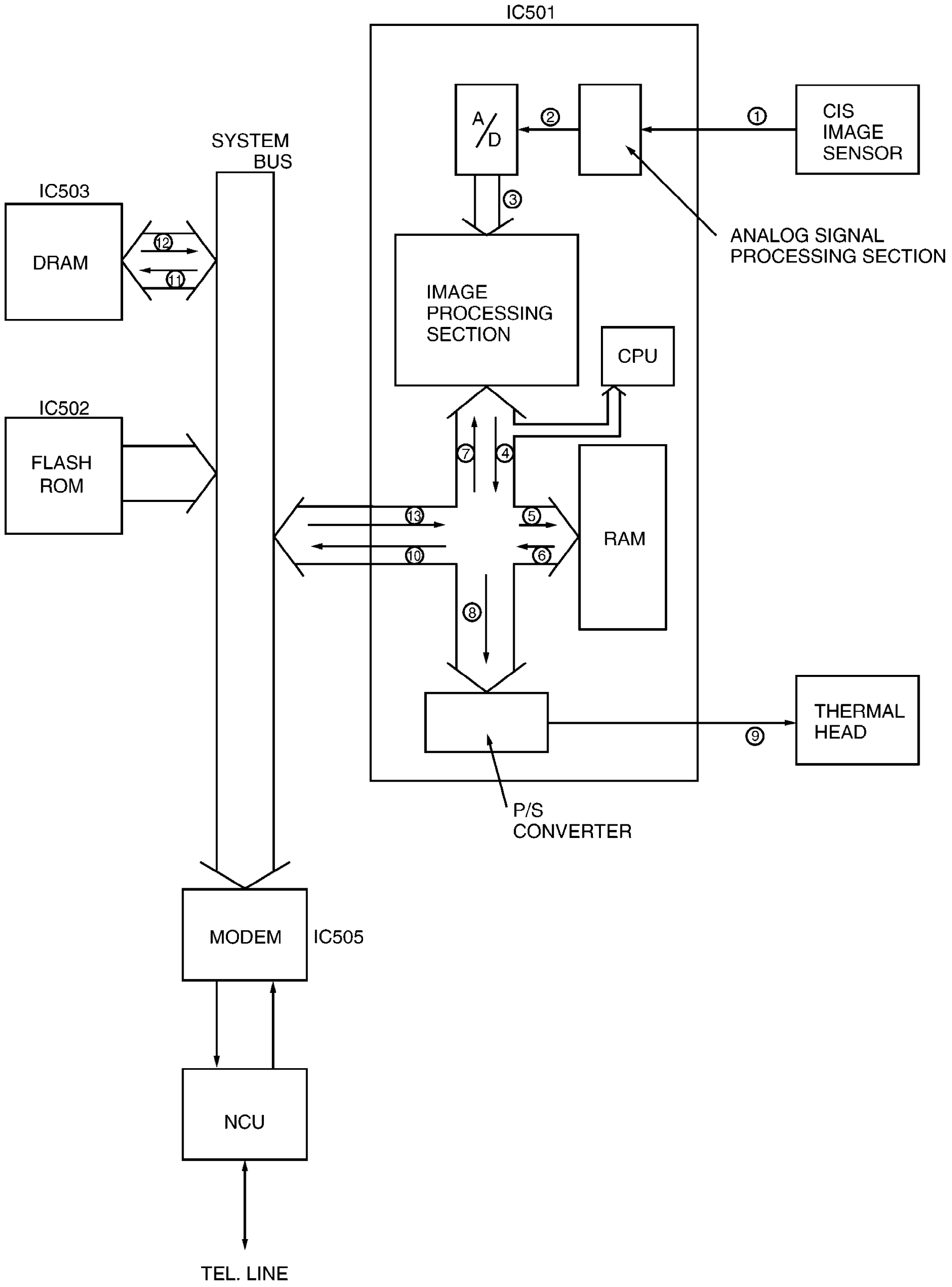
Via route11, it is stored in the communication buffer inside DRAM (IC503).

3. **While retrieving data stored in the communication buffer synchronous with the modem, the CPU (inside IC501) inputs the data to the modem along route12, where it is converted to serial analog data and forwarded over the telephone lines via the NCU Section.**

Reception

1. **The serial analog image data is received over the telephone lines and input to the modem via the NCU section, where it is demodulated to parallel digital data. Then the CPU (IC501) stores the data in the communication buffer DRAM (IC503) along route12.**
2. **The data stored in DRAM (IC503) is decoded by the CPU (IC501) via route12, and is stored in DRAM (IC503) via routes13 and 5.**
3. **Same processing as Copy item 4.**

9.4.2. Block Diagram

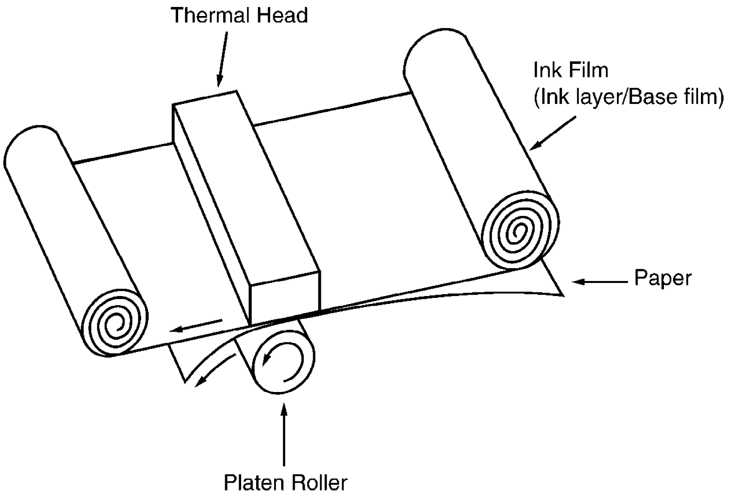

IC501
A/D
②
①
CIS IMAGE SENSOR
SYSTEM BUS
IC503
DRAM
⑫
⑪
③
ANALOG SIGNAL PROCESSING SECTION
IMAGE PROCESSING SECTION
CPU
IC502
FLASH ROM
⑦
④
RAM
⑬
⑤
⑩
⑥
⑧
THERMAL HEAD
⑨
P/S CONVERTER
MODEM
IC505
NCU
TEL. LINE

9.4.3. Thermal Head

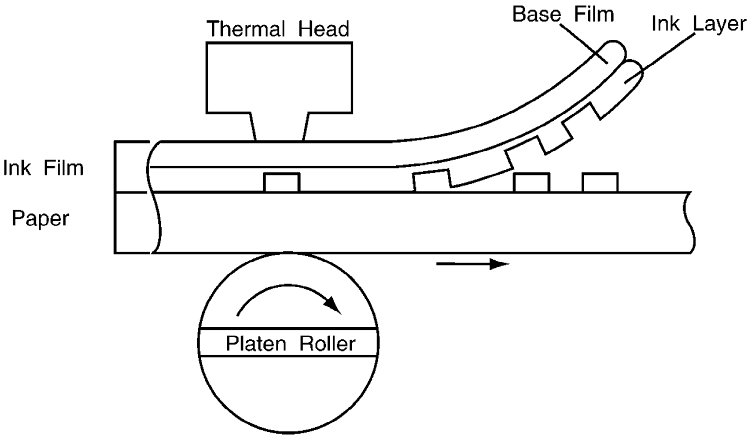
1. Function

This unit utilizes the state of the art thermal printer technology. The ink film is chemically processed. The ink film is comprised of two parts: an ink layer and a base film. When the thermal head contacts this ink film, it emits heat momentarily, and the ink layer is melted and transferred to the paper. If this continues, letters and /or diagrams appear, and the original document is reproduced.

COMPOSITION OF THE RECEIVE RECORD SECTION (THERMAL RECORDING FORMAT)


Thermal Head
Ink Film
(Ink layer/Base film)
Paper
Platen Roller

Thermal Transfer


Thermal Head
Base Film
Ink Layer
Ink Film
Paper
Platen Roller

2. Circuit Operation

Refer to the block diagram and the timing chart on the following page.

There are 9 driver ICs aligned horizontally on the thermal head and each one of these ICs can drive 192 heat-emitting registers.

This means that one line is at a density of 192×9=1728 dots=(8 dots/mm).

White/Black (white=0, black=1) data in one line increment is synchronized at IC501 pin 117 (THCLK) (via IC523), and sent from IC501 pin 116 (THDAT) to the shift register of the ICs via IC523.

The shift registers of the 9 ICs are connected in series, and upon the shift of the 1728 dot increment, the shift register becomes

filled with data, and a latch pulse is emitted to each IC from IC501 pin 118 (THLAT) via IC523.

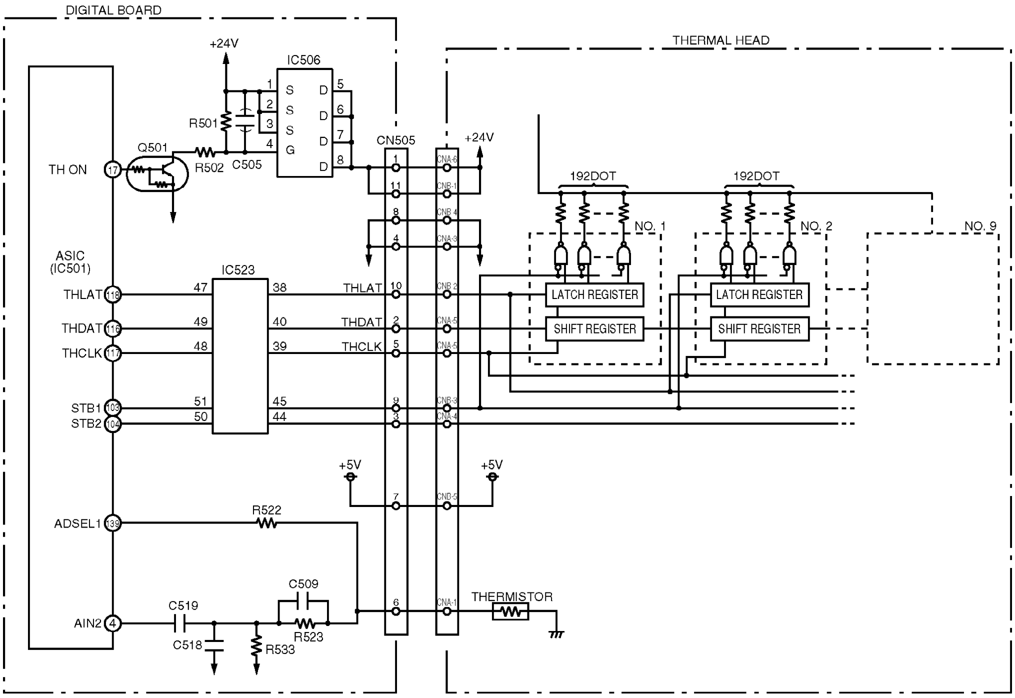
With this latch pulse, all the contents of the shift registers are latched to the latch registers. Thereafter, through the addition of strobes from the IC501 pins (103, 104) via IC523, only the dot location of black (=1) among latched data activates the driver, and the current passes to heat the emitting body to cause heat emission.

Here, the two line strobes, STB1 to STB2, impress at intervals of 9.216 msec, as required for one-line printout.

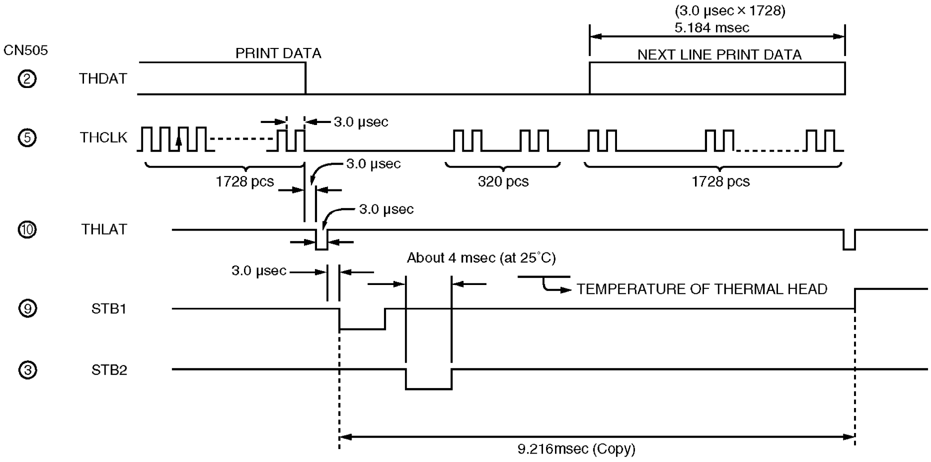
The sequence is shown on the next page. [Moreover, for the strobe width, the thermistor value inside the thermal head is detected according to IC501 pin 4. Depending on that value, the strobe width is recorded in FLASH ROM (IC502). Accordingly, the strobe width is determined.]

When the thermal head is not used, the IC501 (137, THON) becomes low, Q501 turns OFF, IC506 turns OFF, and the +24V power supply for the thermal head driver is not impressed to protect the IC.

Circuit Diagram


DIGITAL BOARD
THERMAL HEAD
+24V
IC506
S
S
S
G
D
D
D
D
1
2
3
4
5
6
7
8
R501
Q501
R502
C505
TH ON
17
CN505
+24V
ASIC
(IC501)
IC523
THLAT
118
47
38
THLAT
10
THDAT
116
49
40
THDAT
2
THCLK
117
48
39
THCLK
5
STB1
103
51
45
9
STB2
104
50
44
3
1
11
8
4
7
6
CNA-6
CNB-1
CNB-4
CNA-3
CNB-2
CNA-5
CNA-5
CNB-3
CNA-4
CNB-5
CNA-1
192DOT
192DOT
NO. 1
NO. 2
NO. 9
LATCH REGISTER
SHIFT REGISTER
LATCH REGISTER
SHIFT REGISTER
+5V
+5V
ADSEL1
139
R522
C509
C519
AIN2
4
R523
C518
R533
THERMISTOR

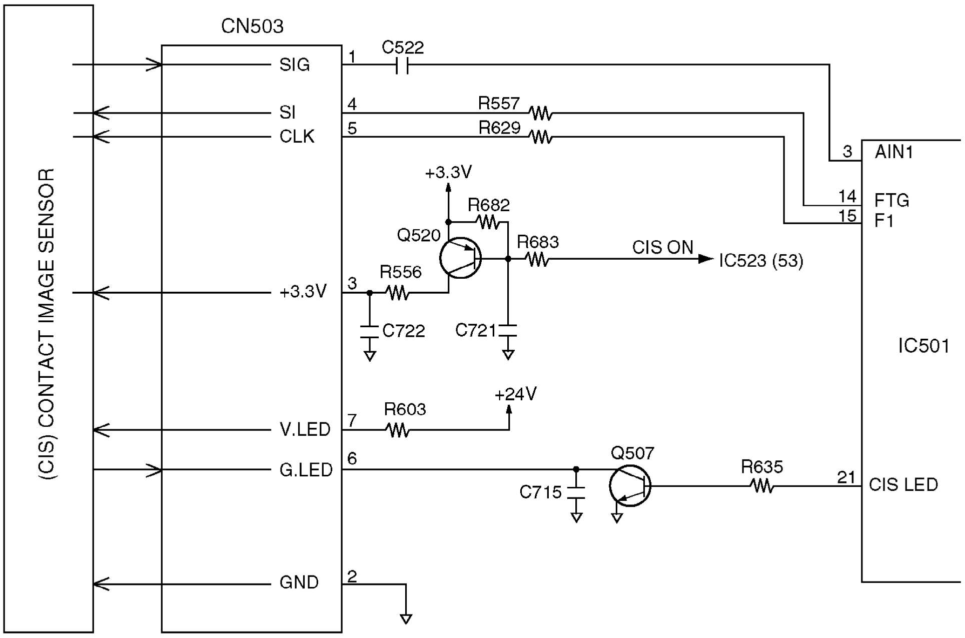
Timing Chart


(3.0 µsec × 1728)
5.184 msec
CN505
PRINT DATA
NEXT LINE PRINT DATA
②
THDAT
⑤
THCLK
3.0 µsec
3.0 µsec
1728 pcs
320 pcs
1728 pcs
⑩
THLAT
3.0 µsec
About 4 msec (at 25˚C)
3.0 µsec
TEMPERATURE OF THERMAL HEAD
⑨
STB1
③
STB2
9.216msec (Copy)

9.4.4. Scanning Block

The scanning block of this device consists of a control circuit and a contact image sensor made up of a celfoc lens array, an LED array, and photoelectric conversion elements.

Circuit Diagram


(CIS) CONTACT IMAGE SENSOR
CN503
SIG
SI
CLK
+3.3V
V.LED
G.LED
GND
1
4
5
3
7
6
2
C522
R557
R629
+3.3V
R682
Q520
R683
R556
C722
C721
CIS ON
IC523 (53)
+24V
R603
Q507
C715
R635
3
AIN1
14
15
FTG
F1
IC501
21
CIS LED

When an original document is inserted and the start button pressed, pin 53 of IC523 goes to a high level and Q520 are turned OFF, pin 21 of IC501 goes to a high level and the transistor Q507 turns on.This applies voltage to the LED array to light it. The contact image sensor is driven by each of the FTG-F1 signals output from IC501, and the original image illuminated by the LED array undergoes photoelectric conversion to output an analog image signal (SIG). The analog image signal is input to the system ASIC on AIN1 (pin 3 of IC501) and converted into 8-bit data by the A/D converter inside IC501. Then this signal undergoes digital processing in order to obtain a high-quality image.

9.4.5. Stepping Motor Drive Circuit (RX)

1. Function

The stepping motor works for reception.

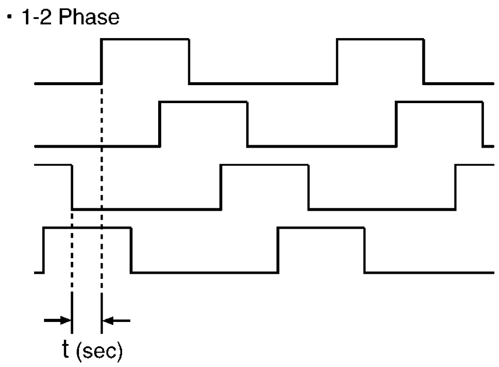
2. Motor

During motor driving, pin 124 of ASIC IC501 becomes a high level, and Q503, Q502 turns ON. As a result, +24V is supplied to the motor coil.

Stepping pulses are output from ASIC IC501 pins, 120~123, causing driver IC508 pins, 10~13 to drive the Motor Coil. The motor coil is energized sequentially in 2 phase increments, which causes a 1-step rotation. A 1-step rotation feeds 0.13 mm of recording paper or document paper.

The timing chart is below.

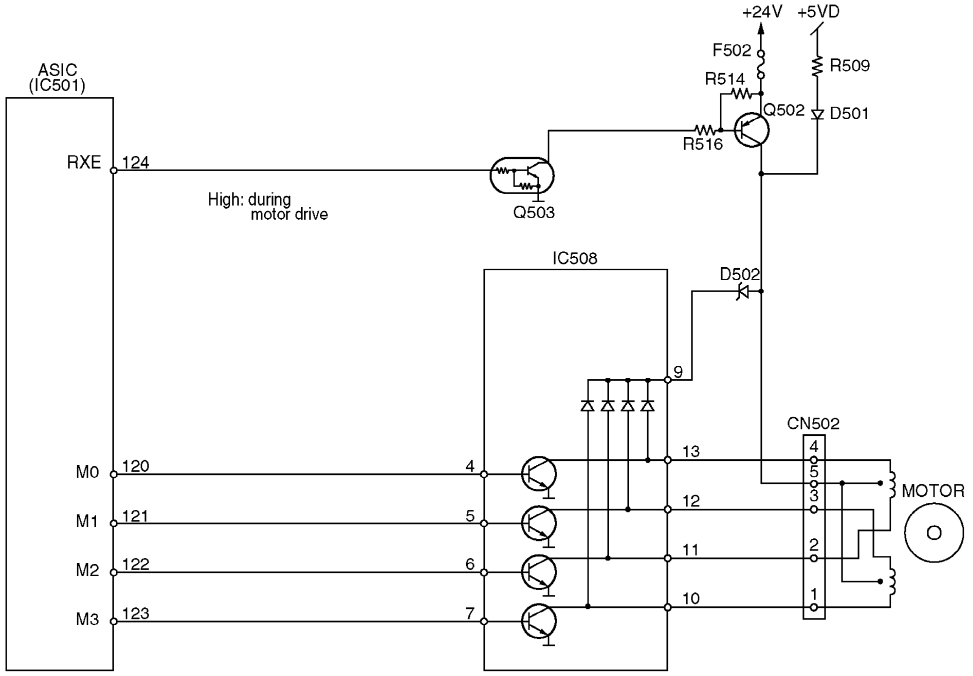
Stepping Monitor Timing Chart



Stepping Motor Drive Mode

Function	Mode	Phase Pattern	Speed
Copy	**Standard or Fine**	**1-2**	**432 pps (t=1/432)**
Paper Feed	———	**1-2**	**432 pps (t=1/432)**
Stand-by	———	**All phases are currently off.**	**None**

Circuit Diagram


+24V
+5VD
F502
R514
R509
ASIC
(IC501)
Q502
D501
R516
RXE
124
High: during motor drive
Q503
IC508
D502
9
CN502
4
5
3
2
1
13
12
11
10
MOTOR
M0
120
4
M1
121
5
M2
122
6
M3
123
7

When the motor suspends while it is in the receive mode (about 70~80 msec), pin 124 of ASIC

IC501 becomes a low level and Q503 turns OFF. Then Q502 also turns OFF, and instead of +24 V, +5 V is supplied through D501 so that the motor is held in place. When the system is in the stand-by mode, all of the motor drive transistors turn OFF. Consequently, the motor current stops.

9.4.6. Stepping Motor Drive Circuit (TX)

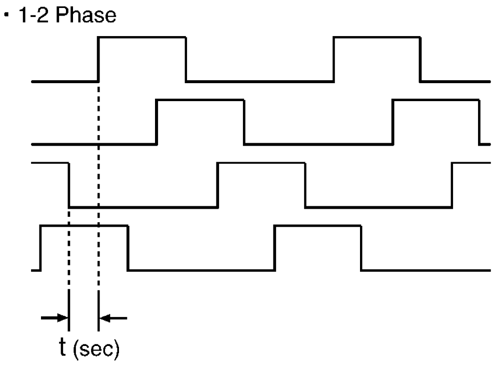
1. Function

The stepping motor works for transmission.

2. Motor

During motor driving, pin 131 of ASIC IC501 becomes a high level, and Q504, Q508 turns ON. As a result, +24V is supplied to the motor coil.
Stepping pulses are output from ASIC IC501 pins, 125, 128~130, causing driver IC509 pins, 10~13 to drive the Motor Coil. The motor coil is energized sequentially in 2 phase increments, which causes a 1-step rotation. A 1-step rotation feeds 0.13 mm of recording paper or document paper.
The timing chart is below.

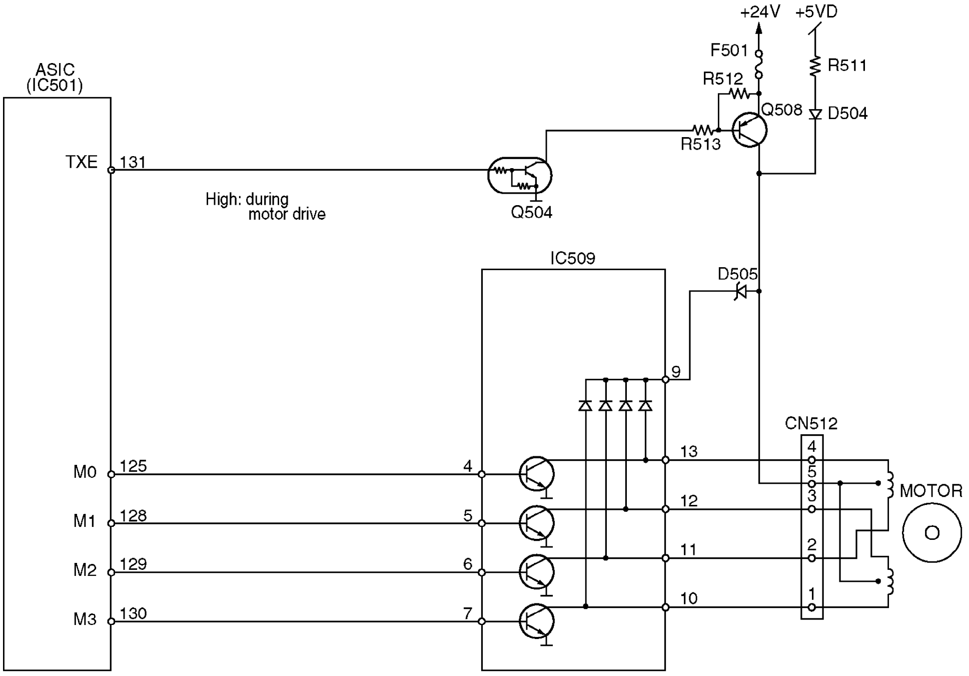
Stepping Monitor Timing Chart



Stepping Motor Drive Mode

Function	Mode	Phase Pattern	Speed
Copy	Standard or Fine	1-2	432 pps (t=1/432)
Paper Feed	———	1-2	432 pps (t=1/432)
Stand-by	———	All phases are currently off.	None

Circuit Diagram


+24V
+5VD
F501
R511
R512
Q508
D504
R513
ASIC
(IC501)
TXE
131
High: during
motor drive
Q504
IC509
D505
9
CN512
MO
125
4
M1
128
5
M2
129
6
M3
130
7
13
12
11
10
4
5
3
2
1
MOTOR

When the motor suspends while it is in the receive mode (about 70~80 msec), pin 131 of ASIC IC501 becomes a low level and Q504 turns OFF. Then Q508 also turns OFF, and instead of +24 V, +5 V is supplied through D501 so that the motor is held in place. When the system is in the stand-by mode, all of the motor drive transistors turn OFF. Consequently, the motor current stops.

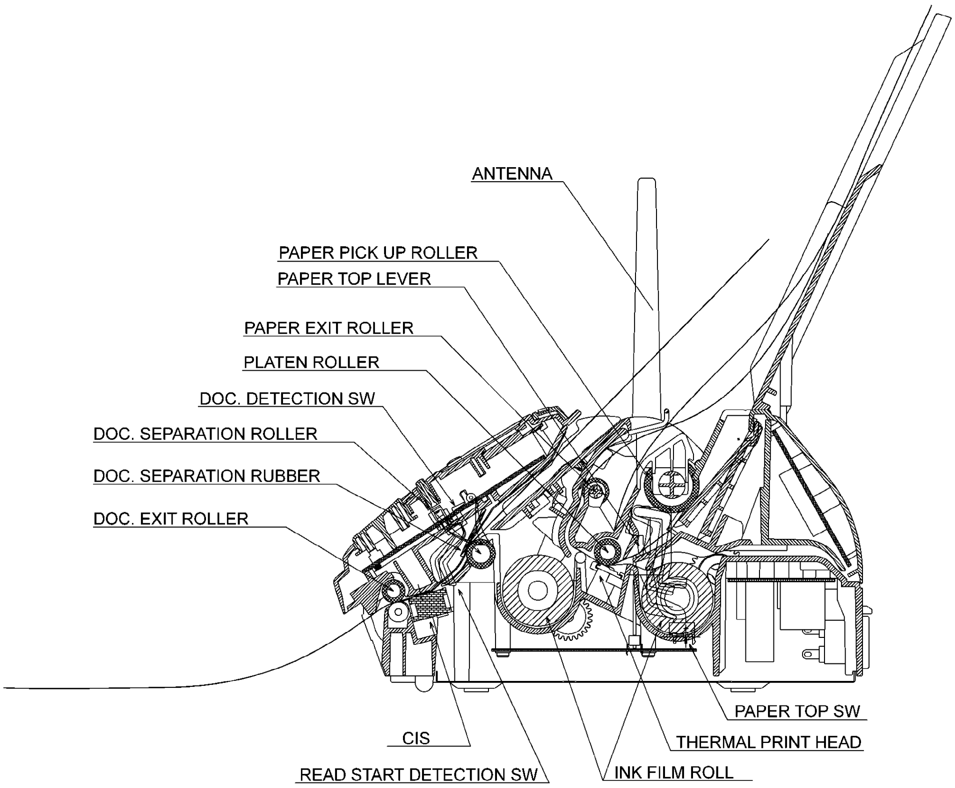
9.5. SENSORS AND SWITCHES

All of the sensor and switches are shown below.

Sensor Circuit Location	Sensor	Sensor or Switch Name	Message Error
Operation Panel	PS301	Document set Sensor	[CHECK DOCUMENT]
	SW351	Document top SW	[REMOVE DOCUMENT]
Digital PCB	SW501	Film End/Cover open SW	[COVER OPEN] or [CHECK FILM]
Sensor PCB	SW402	Paper Top SW	[PAPER JAMMED]

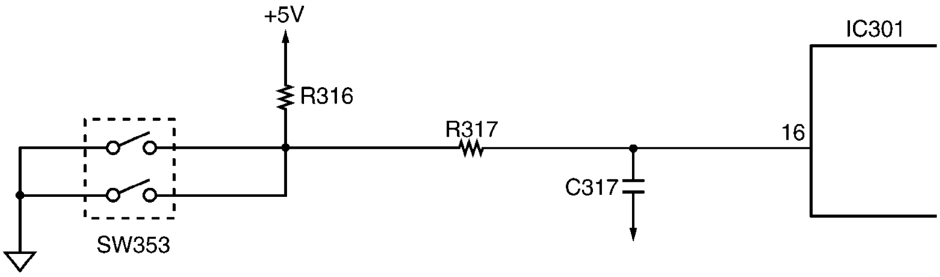
Note:
See TEST FUNCTIONS(). (#815: Sensor Check)

Sensor Locations


ANTENNA
PAPER PICK UP ROLLER
PAPER TOP LEVER
PAPER EXIT ROLLER
PLATEN ROLLER
DOC. DETECTION SW
DOC. SEPARATION ROLLER
DOC. SEPARATION RUBBER
DOC. EXIT ROLLER
PAPER TOP SW
THERMAL PRINT HEAD
CIS
READ START DETECTION SW
INK FILM ROLL

9.5.1. Document Top SW (SW351)................."REMOVE DOCUMENT"

When a document is brought to the read position, the SW turns ON, and the input signal of IC301-16 pin (Operation) becomes a low level. When there is no document at the read position, the SW turns OFF, and the input signal of IC301-16 pin (Operation) becomes a high level.

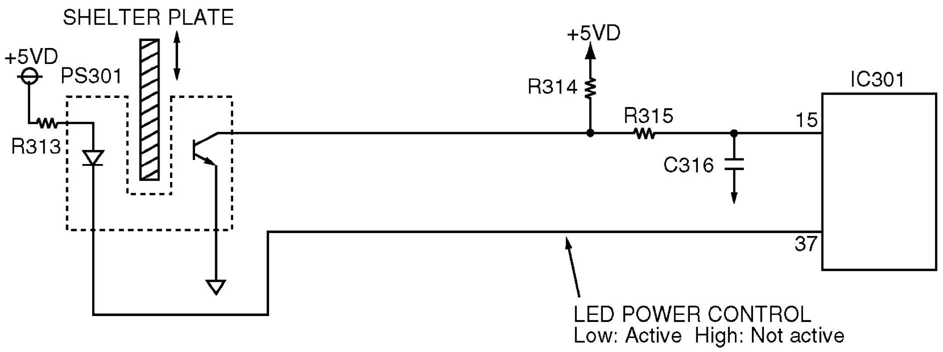

+5V
IC301
R316
R317
16
C317
SW353

Operation Board

	SW	Signal (IC301-16 pin)
Out of the Read Position	OFF	High level
At the Read Position	ON	Low level

9.5.2. Document Set Sensor (PS301)................."CHECK DOCUMENT"

When the document is set, the shelter plate shuts the sensor light, and the photo transistor becomes OFF. The input signal of IC301-15 pin becomes a high level. Usually, the shelter plate is lifted, the photo transistor becomes ON, and the input signal of IC301-15 pin becomes a low level.

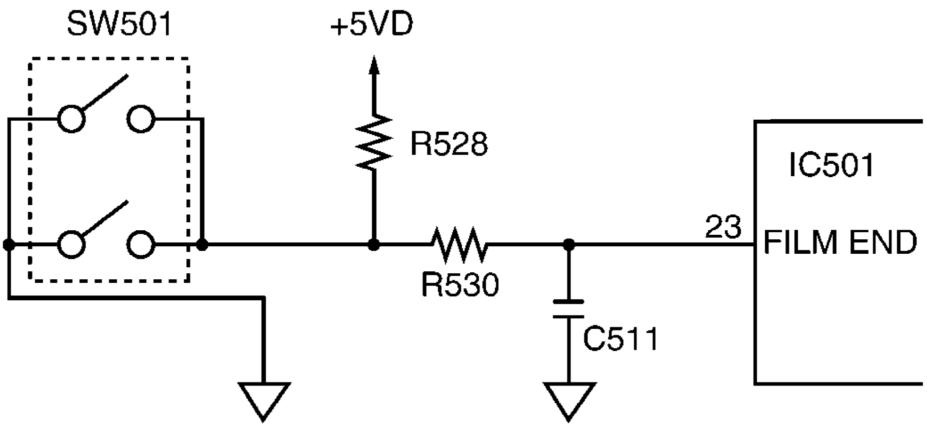

SHELTER PLATE
+5VD
PS301
R313
+5VD
R314
R315
C316
IC301
15
37
LED POWER CONTROL
Low: Active High: Not active

Operation Board

	Photo transistor	Signal (IC301-15 pin)
No document	ON	Low level
Set document	OFF	High level

9.5.3. Cover open / Film end SW (SW501)................"COVER OPEN " or "CHECK FILM"

When the operation panel cover is closed and a film is set, the SW turns ON, and the input signal of IC501-23 pin (Digital) becomes a low level. When the cover is opened, the SW turns OFF, and the input signal of IC501-23 pin (Digital) becomes a high level.

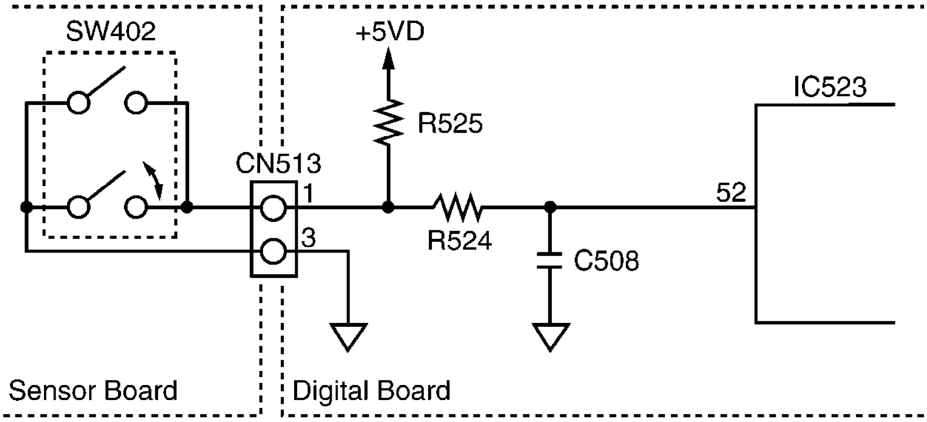

SW501
+5VD
R528
IC501
23
FILM END
R530
C511

Digital Board

	SW	Signal (IC501-23 pin)
Cover open or no film	**OFF**	**High level**
Cover closed and set a film	**ON**	**Low level**

9.5.4. Paper Top Sensor (SW402)........................"PAPER JAMMED"

When the recording paper is loaded on the print head, the SW turns ON, and the input signal of IC523-52 pin (Digital) becomes a low level. When the recording paper is not loaded on the print head, the SW turns OFF, and the input signal of IC523-52 pin (Digital) becomes a high level.



	SW	Signal (IC523-52 pin)
Recording paper top	**ON**	**Low level**
No recording paper	**OFF**	**High level**

9.6. MODEM SECTION

9.6.1. Function

The unit uses a 1 chip modem (IC505) that serves as an interface between the control section for FAX transmission and reception and the telephone line. During a transmitting operation, the digital image signals are modulated and sent to the telephone line.
During a receiving operation, the analog image signals which are received via the telephone line are demodulated and converted into digital image signals. The communication format and procedures for FAX communication are standardized by ITU-T. This 1 chip modem (IC505) has hardware which sends and detects all of the necessary signals for FAX communication.
It can be controlled by writing commands from the CPU (IC501: inside ASIC) to the register in the modem (IC505).
This modem (IC505) also sends DTMF signals, generates a call tone (from the speaker), and detects a busy tone and dial tones.
Overview of Facsimile Communication Procedures (ITU-T Recommendation):

1. ON CCITT (International Telegraph and Telephone Consultative Committee)
The No. XIV Group of ITU-T, one of the four permanent organizations of the International Telecommunications Union (ITU), investigates and make recommendations on international

standards for facsimiles.

2. Definition of Each Group

- Group I (G1)

Official A-4 size documents without using formats which reduce the band width of a signal are sent over telephone lines.

Determined in 1968.

Transmission for about 6 minutes at a scanning line density of 3.85 lines/mm.

- Group II (G2)

Using reduction technology in the modulation/demodulation format, an A-4 size document is sent at an official scanning line density of 3.85 lines/mm for about 3 minutes.

Methods to suppress redundancy are not used.

Determined in 1976.

- Group III (G3)

Method of suppressing redundancy in the image signal prior to modulation is used. An A-4 size document is sent within about one minute.

Determined in 1980.

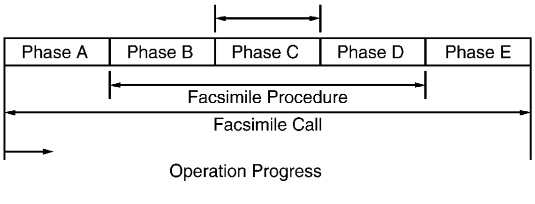
- Group IV (G4)

Transmission is via the data network. A method is provided for suppressing redundancy in signals prior to transmission, and error-free reception of transmission is possible.

The scope of these facsimile applications is not limited simply to transmission of written statements. Through symbiotic linkages with other communication methods, it can be expected to expand to include integrated services.

3. Facsimile Call Time Series

As shown in the following diagram, the facsimile call time series is divided into five phases.



Phase A : Call setting

Call setting can be manual/automatic.

Phase B : Pre-message procedure

Phase B is a pre-processing procedure and sequence for confirming the status of the terminal, transmission route, etc., and for terminal control. It implements terminal preparation status, determines and displays terminal constants, confirms synchronization status, etc. and prepares for transmission of facsimile messages.

Phase C : Message transmission

Phase C is the procedure for the transmitting facsimile messages.

Phase D : Post message procedure

Phase D is the procedure for confirming that the message is completed and received. For continuous transmission, phase B or phase C is repeated for transmission.

Phase E : Call retrieval

Phase E is the procedure for call retrieval, that is for circuit disconnection.

4. Concerning Transmission Time

[Transmission Time] = [Control Time] + [Image Transmission Time] + [Hold Time]

Transmission time consists of the following.

Control time:

This is time at the start of transmission when the functions at the sending and receiving sides are confirmed, the transmission mode is established, and transmission and reception are synchronized.

Image transmission time:

This is the time required for the transmission of document contents (image data). In general, this time is recorded in the catalog, etc.

Hold time:

This is the time required after the document contents have been sent to confirm that the document was actually sent, and to check for telephone reservations and/or the existence of continuous transmission.

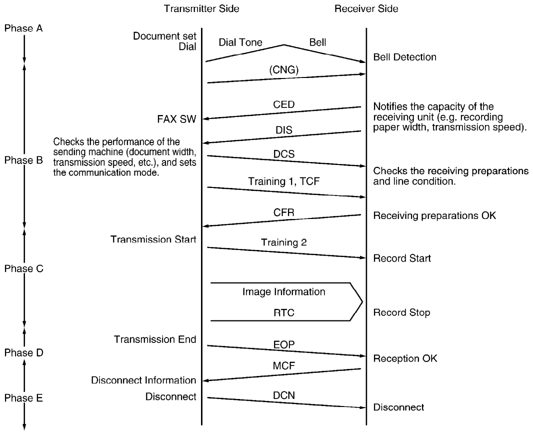
5. Facsimile Standards

Item	Telephone Network Facsimile
	G3 Machine
Connection Control Mode	Telephone Network Signal Mode
Terminal Control Mode	T. 30 Binary
Facsimile Signal Format	Digital
Modulation Mode	PSK (V. 27 ter) or QAM (V. 29)
Transmission Speed	300 bps (Control Signal) 2400, 4800, 7200, 9600, 12000, 14400 bps (FAX Signal)
Redundancy Compression Process (Coding Mode)	1 dimension : MH Mode 2 dimension : MR Mode (K=2.4)
Resolution	Main Scan : 8 pel/mm Sub Scan : 3.85, 7.7l/mm
Line Synchronization Signal	EOL Signal
1 Line Transmission Time [ms/line]	Depends on the degree of data reduction. Minimum Value : 10, 20 Can be recognized in 40ms.

6. Explanation of Communication and Compression Technology

a. G3 Communication Signals (T. 30 Binary Process)

For G3 Facsimile communication, this is the procedure for exchanging control signals between the sending and receiving machines both before and after transmission of image signals.
Control signals at 300 bps FSK are: 1850 Hz...0, 1650Hz...1.
An example of a binary process in G3 communication is shown below.


Transmitter Side
Receiver Side
Phase A
Document set
Dial
Dial Tone
Bell
Bell Detection
(CNG)
CED
FAX SW
Notifies the capacity of the receiving unit (e.g. recording paper width, transmission speed).
DIS
Checks the performance of the sending machine (document width, transmission speed, etc.), and sets the communication mode.
Phase B
DCS
Checks the receiving preparations and line condition.
Training 1, TCF
CFR
Receiving preparations OK
Transmission Start
Training 2
Record Start
Phase C
Image Information
RTC
Record Stop
Transmission End
EOP
Phase D
Reception OK
MCF
Disconnect Information
Phase E
Disconnect
DCN
Disconnect

Explanation of Signals

Control signals are comprised mainly of 8-bit identification signals and the data signals added to them. Data signals are added to DIS and DCS signals.
Signal.....DIS (Digital Identification Signal)
Identification Signal Format.....00000001

Function:
Notifies the capacity of the receiving unit. The added data signals are as follows.
Signal.....DCS (Digital Command Signal)
Identification Signal Format.....X1000001
Example (Some models do not support the following items.):

Bit No.	DIS/DTC	DCS
1	Transmitter --- T.2 operation	
2	Receiver --- T.2 operation	Receiver --- T.2 operation
3	T.2 IOC = 176	T.2 IOC = 176
4	Transmitter --- T.3 operation	
5	Receiver --- T.3 operation	Receiver --- T.3 operation
6	V.8 features	Invalid
7	Reserved for future T.3 operation features.	Invalid
8	Reserved for future T.3 operation features.	
9	Transmitter --- T.4 operation	
10	Receiver --- T.4 operation	Receiver --- T.4 operation
11, 12, 13, 14	Data signaling rate	Data signaling rate
0, 0, 0, 0	V.27 ter fall back mode	2400 bit/s, V.27 ter
0, 1, 0, 0	V.27 ter	4800 bit/s, V.27 ter
1, 0, 0, 0	V.29	9600 bit/s, V.29
1, 1, 0, 0	V.27 ter and V.29	7200 bit/s, V.29
0, 0, 1, 0	Not used	14400 bit/s, V.33
0, 1, 1, 0	Reserved	12000 bit/s, V.33
1, 0, 1, 0	Not used	Reserved
1, 1, 1, 0	Invalid	Reserved
0, 0, 0, 1	Not used	14400 bit/s, V.17
0, 1, 0, 1	Reserved	12000 bit/s, V.17
1, 0, 0, 1	Not used	9600 bit/s, V.17
1, 1, 0, 1	V.27 ter and V.29 and V.17	7200 bit/s, V.17
0, 0, 1, 1	Not used	Reserved
0, 1, 1, 1	Reserved	Reserved
1, 0, 1, 1	Not used	Reserved
1, 1, 1, 1	Reserved	Reserved
15	R8×7.7 lines/mm and/or 200×200 pels/ 25.4mm	R8×7.7 lines/mm and/or 200×200 p 25.4mm
16	Two-dimensional coding capability	Two-dimensional coding capabilit

Bit No.	DIS/DTC	DCS
17, 18	Recording width capabilities	Recording width
(0, 0)	1728 picture elements along scan line length of 215 mm ± 1%	1728 picture elements along scan length of 215 mm ± 1%
(0, 1)	1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1% 2432 picture elements along scan line length of 303 mm ± 1%	2432 picture elements along scan length of 303 mm ± 1%
(1, 0)	1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1%	2048 picture elements along scan length of 255 mm ± 1%
(1, 1)	Invalid	Invalid
19, 20	Maximum recording length capability	Maximum recording length
(0, 0)	A4 (297 mm)	A4 (297 mm)
(0, 1)	Unlimited	Unlimited
(1, 0)	A4 (297 mm) and B4 (364 mm)	B4 (364 mm)
(1, 1)	Invalid	Invalid
21, 22, 23	Minimum scan line time capability of the receiver	Minimum scan line time
(0, 0, 0)	20 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	20 ms
(0, 0, 1)	40 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	40 ms
(0, 1, 0)	10 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	10 ms
(1, 0, 0)	5 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	5 ms
(0, 1, 1)	10 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 1, 0)	20 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 0, 1)	40 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 1, 1)	0 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	0 ms
24	Extend field	Extend field
25	Reserved	2400 bit/s handshaking
26	Uncompressed mode	Uncompressed mode
27	Error correction mode	Error correction mode
28	Set to "0".	Frame size 0 = 256 octets 1 = 64 o
29	Reserved	Reserved
30	Reserved	Reserved
31	T.6 coding capability	T.6 coding enabled
32	Extend field	Extend field

Bit No.	DIS/DTC	DCS
33 (0) (1)	Validity of bits 17, 18 Bits 17, 18 are valid Bits 17, 18 are invalid	Recording width Recording width indicated by bits Recording width indicated by this information
34	Recording width capability 1216 picture elements along scan line length of 151 ± mm 1%	Middle 1216 elements of 1728 pict elements
35	Recording width capability 864 picture elements along scan line length of 107 ± mm 1%	Middle 864 elements of 1728 pictu elements
36	Recording width capability 1728 picture elements along scan line length of 151 ± mm 1%	Invalid
37	Recording width capability 1728 picture elements along scan line length of 107 ± mm 1%	Invalid
38	Reserved	
39	Reserved	
40	Extend field	Extend field
41	R8×15.4 lines/mm	R8×15.4 lines/mm
42	300×300 pels/25.4 mm	300×300 pels/25.4 mm
43	R16×15.4 lines/mm and/or 400×400 pels/ 25.4 mm	R16×15.4 lines/mm and/or 400×40 25.4 mm
44	Inch based resolution preferred	Resolution type selection "0" : neuritic based resolution "1" : inch based resolution
45	Metric based resolution preferred	Don't care
46	Minimum scan line time capability for higher resolutions "0" : $T_{15.4} = T_{7.7}$ "1" : $T_{15.4} = 1/2T_{7.7}$	Don't care
47	Selective Polling capability	Set to "0".
48	Extend field	Extend field

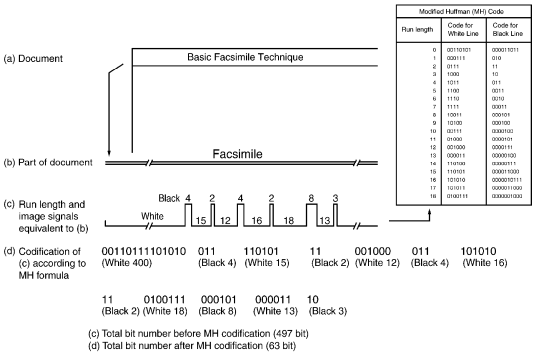
Note 1 - Standard facsimile units conforming to T.2 must have the following capability : Index of cooperation (IOC)=264.

Note 2 - Standard facsimile units conforming to T.3 must have the following capability : Index of cooperation (IOC)=264.

Note 3 - Standard facsimile units conforming to T.4 must have the following capability : Paper length=297 mm.

Signal	Identification Signal Format	Function
Training 1	—	A fixed pattern is transmitted to the receiving sid speed (2400 to 14400 bps) designated by DCS, an receiving side optimizes the automatic equalizer, according to this signal.
TCF (Training Check)	—	Sends 0 continuously for 1.5 seconds at the sam as the training signal.
CFR (Confirmation to Receive)	X0100001	Notifies the sending side that TCF has been prop received. If TCF is not properly received, FTT (Fai Train) X0100010 is relayed to the sender. The sen reduces the transmission speed by one stage an training once again.
Training 2	—	Used for reconfirming the receiving side like train
Image Signal	Refer to the next page.	—
RTC (Return to Control)	—	Sends 12 bits (0...01 × 6 times) to the receiver at t speed as the image signal and notifies completio transmission of the first sheet.
EOP (End of Procedure)	X1110100	End of one communication
MCF (Message Confirmation)	X0110001	End of 1 page reception
DCN (Disconnect)	X1011111	Phase E starts.
MPS (Multi-Page Signal)	X1110010	Completion of transmission of 1 page. If there are more documents to be sent, they are output inste EOP. After MCF reception, the sender transmits a signal of the second sheet.
PRI-EOP (Procedural Interrupt-EOP)	X1111100	If there is an operator call from the sender, it is o after RTC.
PIP (Procedural Interrupt Positive)	X0110101	This is output when an operator call is received.

b. Redundancy Compression Process Coding Mode
This unit uses one-dimensional MH format.


(a) Document
Basic Facsimile Technique
(b) Part of document
Facsimile
(c) Run length and image signals equivalent to (b)
Black 4 2 4 2 8 3
White 15 12 16 18 13
(d) Codification of (c) according to MH formula
00110111101010 (White 400)
011 (Black 4)
110101 (White 15)
11 (Black 2)
001000 (White 12)
011 (Black 4)
101010 (White 16)
11 (Black 2)
0100111 (White 18)
000101 (Black 8)
000011 (White 13)
10 (Black 3)
(c) Total bit number before MH codification (497 bit)
(d) Total bit number after MH codification (63 bit)

Modified Huffman (MH) Code		
Run length	Code for White Line	Code for Black Line
0	00110101	000011011
1	000111	010
2	0111	11
3	1000	10
4	1011	011
5	1100	0011
6	1110	0010
7	1111	00011
8	10011	000101
9	10100	000100
10	00111	0000100
11	01000	0000101
12	001000	0000111
13	000011	00000100
14	110100	00000111
15	110101	000011000
16	101010	0000010111
17	101011	0000011000
18	0100111	0000001000

9.6.2. Modem Circuit Operation

The modem (IC505) has all the hardware satisfying the ITU-T standards mentioned previously. When the ASIC IC501 (61) is brought to a low level, the modem (IC505) is chip-selected and the resistors inside IC are selected by the select signals from ASIC (IC501) ADR0-ADR4(pin 83~87). Commands are written through the data bus, and all processing is controlled by the ASIC (IC501) according to ITU-T procedures. Here, the INT signal dispatched from IRQ (pin 60 of IC505) to the ASIC (IC501) implements post processing.

This modem (IC505) has an automatic application equalizer. With training signal 1 or 2 at the time of G3 reception, it can automatically establish the optimum equalizer. The modem (IC505) clock is supplied by pin 55 of ASIC (IC501).

1. Facsimile Transmission/DTMF Line Send

The digital image data on the data bus is modulated in the modem (IC505), and sent from pin 69 via, Analog SW IC520(8 → 9), amplifier IC521(6 → 7) and the NCU section to the telephone line.

Refer to Check Sheet().

2. Facsimile Reception

The analog image data which is received from the telephone line passes through the NCU section and enters pin 45 of the modem (IC505). The signals that enter pin 45 of the modem (IC505) are demodulated in the board to digital image signals, then placed on the data bus.

In this case, the image signals from the telephone line are transmitted serially. Hence, they are placed on the bus in 8 bit units. Here, the internal equalizer circuit reduces the image signals to a long-distance receiving level.

This is designed to correct the characteristics of the frequency band centered around 3 kHz and maintain a constant receiving sensitivity.

It can be set in the service mode.

Refer to Check Sheet().

3. **DTMF Transmission (Monitor tone)**

The DTMF signal generated in the modem (IC505) is output from pin 69, and the NCU section to the telephone line the same as facsimile transmission signals.

(DTMF Monitor Tone)

Refer to Check Sheet().

4. **Busy/Dial Tone Detection**

The path is the same as FAX receiving. When it is detected, the carrier detect bit of the resistor in the modem (IC505) becomes 1, and this status is monitored by ASIC (IC501).

9.7. DESCRIPTION OF BLOCK DIAGRAM IN ANALOG SECTION

1. **Function**

The analog section serves as an interface between the telephone line. The digital board (IC505) for transmission and reception of FAX signals, switches between the digital board (IC505) and other sections by means of a multiplexer in the NCU section. The control signals to the individual analog sections are output mainly from ASIC IC501, and the status information for the various sections is also held in ASIC IC501.

Simple explanations for the various sections are given below.

2. **Circuit Operation**

[NCU Section]

This is composed of a bell detection circuit, pulse dial generation circuit, CPC detect circuit, vox circuit, amplifier circuit for line transmission and reception, sidetone circuit, Extension phone line off-hook detection circuit, Remote FAX activation circuit.

[Modem (IC505)]

This is used for FAX signal tone modulation, DTMF signal transmission. The DTMF signal is placed into the TX system.

9.7.1. Analog Board Block Diagram

9.8. NCU SECTION

9.8.1. General

It is composed of bell detection circuit, pulse dial circuit, TAM interface circuit, line amplifier, sidetone circuits, Remote FAX activation circuit, CPC detection, and a multiplexer.

9.8.2. Remote Fax Activation Circuit

1. Circuit Operation

After detecting the bell signal, another telephone connected to the same line switches to the FAX mode by DTMF signal.

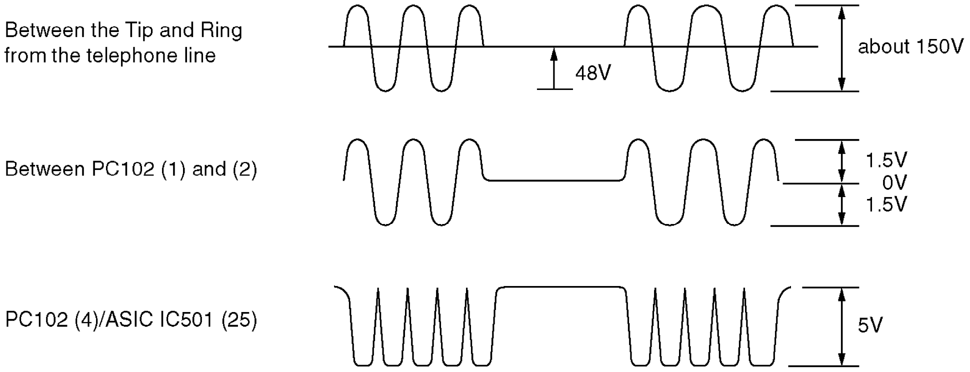
TEL LINE → C118 → R125 → IC103(6-7) → R283 → CN201(8) → {CN501(8) → C685 → IC522(4-3) → C711 → R576 → IC505(60)}

9.8.3. Bell Detection Circuit

1. Circuit Operation

The signal waveform for each point is indicated below. The signal (low level section) input to pin 25 of ASIC IC501 on the digital board is read by ASIC and judged as a bell.

TEL LINE → PC102(1, 2 - 4) → IC501(25)


Between the Tip and Ring from the telephone line
48V
about 150V
Between PC102 (1) and (2)
1.5V
0V
1.5V
PC102 (4)/ASIC IC501 (25)
5V

9.8.4. Pulse Dial Circuit and ON/OFF Hook Circuit

While OFF-HOOK, RL101 is ON. Q103 turns on by pin (24) of IC501 as well. On the other hand, while ON-HOOK, Q103 turns OFF by pin (24) of IC501, then the line turns OFF. ON/OFF-HOOK, controlled by pin (24) of IC501, makes the pulse dial operation possible.

IC501 (24) LINE RLY Low Level → CN601 (3) → CN201 (3) → Q103 OFF → RL101 OFF : DC Loop OFF

IC501 (24) LINE RLY High Level → CN601 (3) → CN201 (3) → Q103 ON → RL101 ON : DC Loop ON

9.8.5. Line Amplifier and Side Tone Circuit

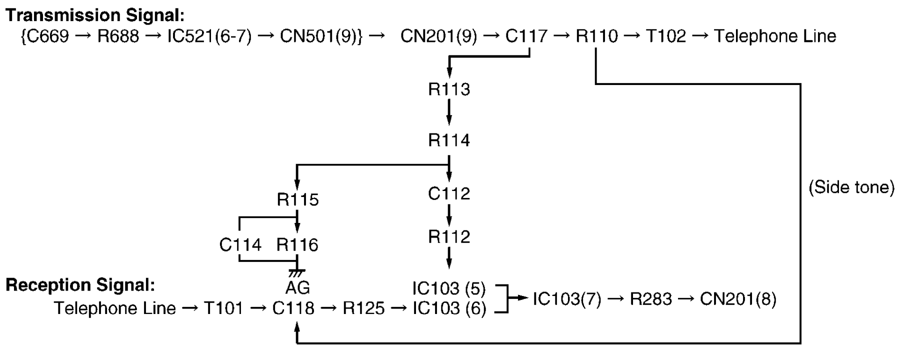
1. Circuit Operation

The reception signal output from the line transformer T101 is input to pin (6) of IC103 via C118, R125 and then the signal is amplified at pin (7) of IC103 and sent to the reception system at 0dB.

The transmission signal goes through C669 and R688 and enters

IC521-pin (6), where the signal is amplified to about 28dB. Then, it is output from pin (7) of IC521 and transmitted to T101 via C117 and R110. If the side tone circuit is not applied, the transmission signal will return to the reception amplifier via C118 and R125. When the side tone circuit is active, the signal output from IC101 pin (7) passes through C117, R113, R114, C112 and R112 and goes into the amplifier IC103 pin (5). This circuit is used to cancel the transmission return signal.

Side Tone Circuit


Transmission Signal:
{C669 → R688 → IC521(6-7) → CN501(9)} → CN201(9) → C117 → R110 → T102 → Telephone Line
R113
R114
C112
R112
R115
C114
R116
AG
(Side tone)
Reception Signal:
Telephone Line → T101 → C118 → R125 → IC103 (6)
IC103 (5)
IC103(7) → R283 → CN201(8)

Note:
{ }: Inside the digital board

9.8.6. Auto Disconnect Circuit

1. Function

This circuit is used to detect that the telephone connected in parallel to the same line is OFF-HOOK while the unit picks up the line.

2. Circuit Operation

If the line is picked up, C158 is charged by the following path shown below.
Tip (Ring) → D107 → R159 → D108 → R161 → Q104 → PC103
If a telephone connected in parallel goes into OFF-HOOK status, the base of Q104 becomes low and PC103 turns OFF.
When the line is connected, Q104 and PC103 turn on, then pin (94) of IC505 (MODEM) on the digital board becomes low. On the other hand, When the line is disconnected, Q104 and PC103 turn off, then the pin (94) of IC505 (MODEM) becomes high.

9.8.7. CPC (Calling Party Control) Detection Circuit

1. Function

This circuit detects the signal (cuts the current) output from the converter when the other party finishes ICM recording and goes into the ON-HOOK status.

TAD detects this signal and disconnects the line. When the TAD is operating, pin (4) of PC104 becomes a low level.

While detecting the CPC signal, pin (4) of PC104 becomes a high level. When the CPC signal is detected, the TAD operation stops and the line is disconnected.

9.8.8. Calling Line Identification Circuit

1. Function

This unit is compatible with the Caller ID service offered by your local telephone company. To use this feature, you must subscribe to a Caller ID service. The data for the caller ID from the telephone exchange is sent during the interval between the first and second rings of the bell signal. The data from the telephone exchange is a modem signal which is modulated in an FSK (Frequency Shift Keying) format. Data "0" is a 1200 Hz sine wave, and data 1 a 2200 Hz sine wave.

There are two type of the message format which can be received: i.e.the single data message format and multiple data message format.

The multiple data format allows to transmit the name and data code information in addition to the time and telephone number data.

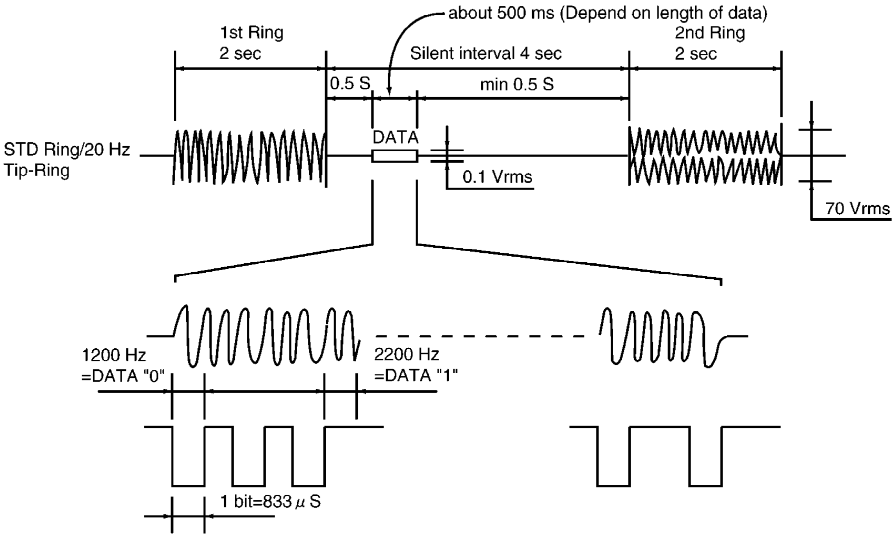
When there is multiple data in the unit, the name or telephone number are displayed.

2. Circuit Operation:

The caller ID signal input from TEL LINE is processed with MODEM (IC505).

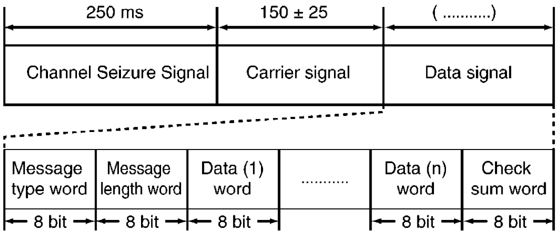
Refer to Check Sheet () for the route of caller ID signal.

Timing Chart



about 500 ms (Depend on length of data)
1st Ring
2 sec
2nd Ring
2 sec
Silent interval 4 sec
0.5 S
min 0.5 S
DATA
STD Ring/20 Hz
Tip-Ring
0.1 Vrms
70 Vrms
1200 Hz
=DATA "0"
2200 Hz
=DATA "1"
1 bit=833 μ S

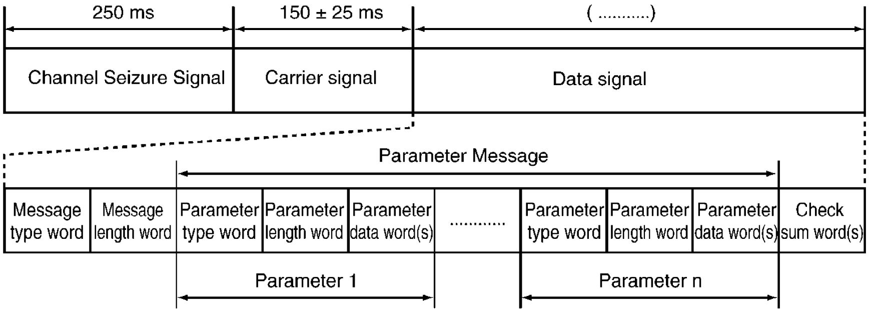
• Single data message



250 ms
150 ± 25
(...........)
Channel Seizure Signal
Carrier signal
Data signal
Message type word
Message length word
Data (1) word
....
Data (n) word
Check sum word
8 bit
8 bit
8 bit
8 bit
8 bit

- •1 word = All 8 bit data
- •Message Type Word = Fixed value "00000100"
- •Message Length Word = number of the data word
- •Data word = The data value (month, day, hour, minute, telephone number)

· Multiple data message



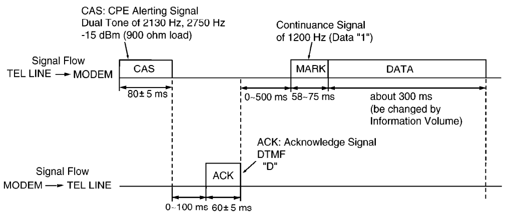
250 ms
150 ± 25 ms
(...........)
Channel Seizure Signal
Carrier signal
Data signal
Parameter Message
Message type word
Message length word
Parameter type word
Parameter length word
Parameter data word(s)
....
Parameter type word
Parameter length word
Parameter data word(s)
Check sum word(s)
Parameter 1
Parameter n

- ·1 word = All 8 bit data
- ·Message Type = Fixed value "10000000"
- ·Message Length Word = number of the Parameter Message word
- ·Parameter Type Word = Kind of data (ex. the time, phone number)
- ·Parameter Length Word = number of the Parameter data word
- ·Parameter Word (s) = the data value

Call Waiting

Calling Identity Delivery on Call Waiting (CIDCW) is a CLASS service that allows a customer, while off-hook on an existing call, to receive information about a calling party on a waited call. The transmission of the calling information takes place almost immediately after the customer is alerted to the new call so he/she can use this information to decide whether to take the new call.

Call Waiting Format


CAS: CPE Alerting Signal
Dual Tone of 2130 Hz, 2750 Hz
-15 dBm (900 ohm load)
Continuance Signal
of 1200 Hz (Data "1")
Signal Flow
TEL LINE → MODEM
CAS
MARK
DATA
80± 5 ms
0~500 ms
58~75 ms
about 300 ms
(be changed by
Information Volume)
ACK: Acknowledge Signal
DTMF
"D"
Signal Flow
MODEM → TEL LINE
ACK
0~100 ms
60± 5 ms

9.9. ITS (Integrated Telephone System) AND MONITOR SECTION

9.9.1. General

During the monitor operation, the speaker output passes through the power amplifier (IC102) [Analog board].

The DTMF signal is output from the modem (IC505: digital board). The alarm tone, the key tone, bell tone, and beep are output from gate array IC501 (digital board). During a pulse dial operation, the monitor tone is output from gate array IC501.

9.9.2. Speakerphone Circuit

1. Function

The circuit controls the automatic switching of the transmitted and received signals, to and from the telephone line, when the unit is used in the hands-free mode.

2. Circuit Operation

The speakerphone can only provide duplex.

3. Signal path

Refer to Check Sheet().

9.9.3. Handset Circuit

1. Function

This circuit controls the conversation over the handset, i.e. the transmitted and received voices to and from the handset.

2. Signal path (Transmission signal)

Refer to Check Sheet().

3. Signal path (Reception signal)

Refer to Check Sheet().

9.9.4. Monitor Circuit

1. Function

This circuit monitors various tones, such as 1 DTMF tone,2 Alarm/ Beep/Key tone/Bell 3 Dummy ring back tone.

2. Signal path

A. DTMF MONITOR

(Speaker Operation)

Refer to Check Sheet().

(Handset Operation)

Refer to Check Sheet().

B. ALARM/BEEP/KEY TONE/BELL

Refer to Check Sheet().

C. DUMMY RING BACK TONE

Refer to Check Sheet().

9.10. ATAS (Automatic Telephone Answering System) SECTION

1. Function

The ATAS main operation is performed by the special IC505 (MODEM). IC512 (FLASH MEMORY) control signals are input from ASIC IC501.

A. Greeting/Message Recording
B. ICM Recording
C. Greeting/Message/ICM play to speaker
D. Greeting/Message/ICM play to Tel Line
E. Vox Detection

2. Signal Path

Refer to Check Sheet().

9.11. OPERATION BOARD SECTION

The unit consists of a LCD (Liquid crystal display), KEYs and LEDs (light-emitting diodes). They are controlled by the Gate Array (IC301) and ASIC (IC501: on the DIGITAL BOARD). (Fig.-a) The key matrix table is shown below.

Key Matrix

	KIN0	KIN1	KIN2	KIN3	KIN4	KIN5	KIN6	KIN7
KSL0	SW301 COPY	SW305 MUTE	SW310 REDIAL / PAUSE	SW315 FLASH	SW320 (NC)	SW325 (NC)	SW330 SP-PHONE/MONITOR	SW334 (—)
KSL1		SW306 3	SW311 2	SW316 1	SW321 CALLER-IQ	SW326 RECORD		
KSL2	SW302 FAX / START / SET	SW307 #	SW312 0	SW317 *	SW322 (NC)	SW327 AUTO ANSWER	SW331 MENU	SW335 ←
KSL3	SW303 CALLER-ID	SW308 6	SW313 5	SW318 4	SW323 (NC)	SW328 ERASE	SW332 (+)	SW336 STOP
KSL4	SW304 LOCATOR/INTERCOM	SW309 9	SW314 8	SW319 7	SW324 (NC)	SW329 PLAY MESSAGES	SW333 →	SW337 HELP

XL

	XL12	XL11
	DOCUMENT SET	DOCUMENT TOP

LED

	LED2	LED3	LED4	LED5
	NEW MESSAGES			CALLER IQ

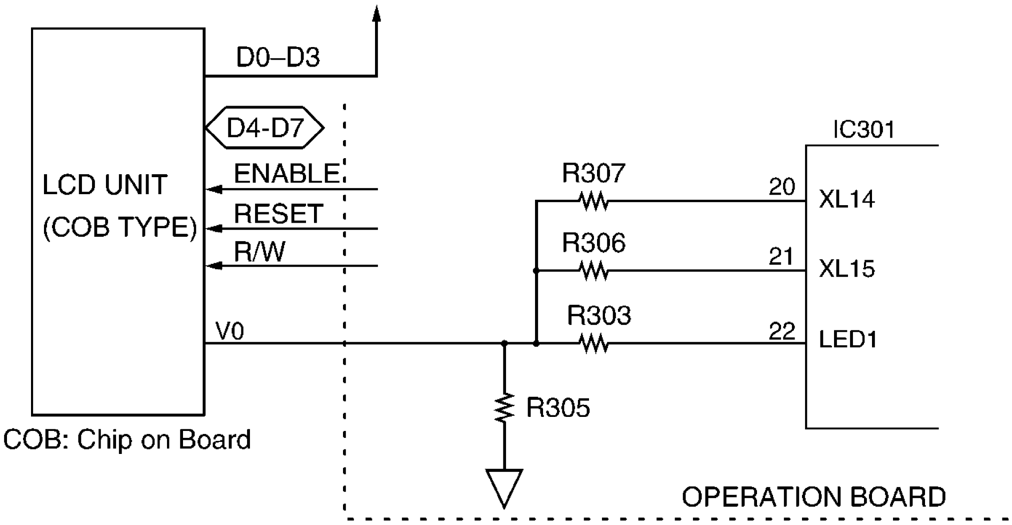
9.12. LCD SECTION

The Gate Array (IC301) works only for writing the ASCII code from the data bus (D4~D7). V0 is supplied for the crystal drive.

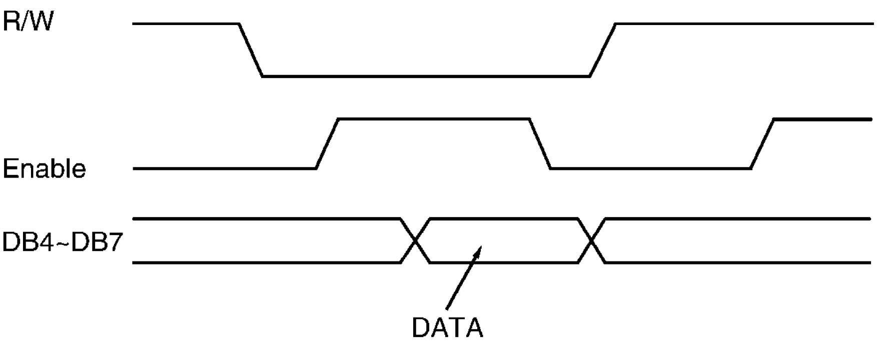
R303, R305 and R306 are density control resistors.

Consequently, in this unit, the timing (positive clock) is generated by the LCD interface circuitry in the gate array (IC301).

Circuit Diagram


D0–D3
D4-D7
LCD UNIT
(COB TYPE)
ENABLE
RESET
R/W
V0
COB: Chip on Board
R307
R306
R303
R305
IC301
20
XL14
21
XL15
22
LED1
OPERATION BOARD

Timing Chart

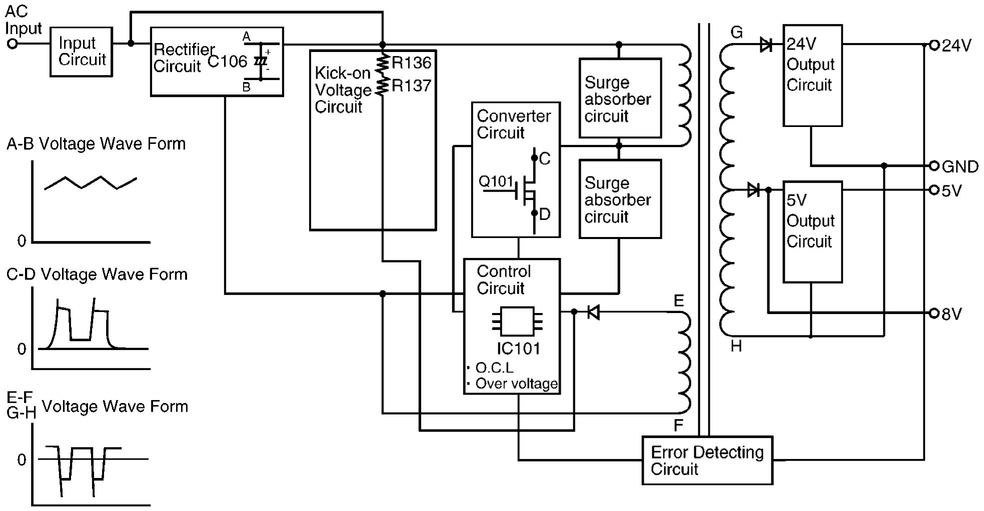

R/W
Enable
DB4~DB7
DATA

DIsplay mode	Density	Normal	Dark
2 lines (X1.0)	LED1 (IC301-22pin)	H	L
	XL14 (IC301-20pin)	Hi-Z	L
	XL15 (IC301-21pin)	L	L
1 line (X1.5)	LED1	H	H
	XL14	Hi-Z	Hi-Z
	XL15	Hi-Z	L

9.13. POWER SUPPLY BOARD SECTION

This power supply board uses the switching regulator method.

Block Diagram


AC Input
Input Circuit
Rectifier Circuit
C106
A
B
Kick-on Voltage Circuit
R136
R137
Converter Circuit
Q101
C
D
Surge absorber circuit
Surge absorber circuit
Control Circuit
IC101
• O.C.L
• Over voltage
E
F
G
H
24V Output Circuit
5V Output Circuit
24V
GND
5V
8V
Error Detecting Circuit
A-B Voltage Wave Form
0
C-D Voltage Wave Form
0
E-F
G-H Voltage Wave Form
0

[Input Circuit]

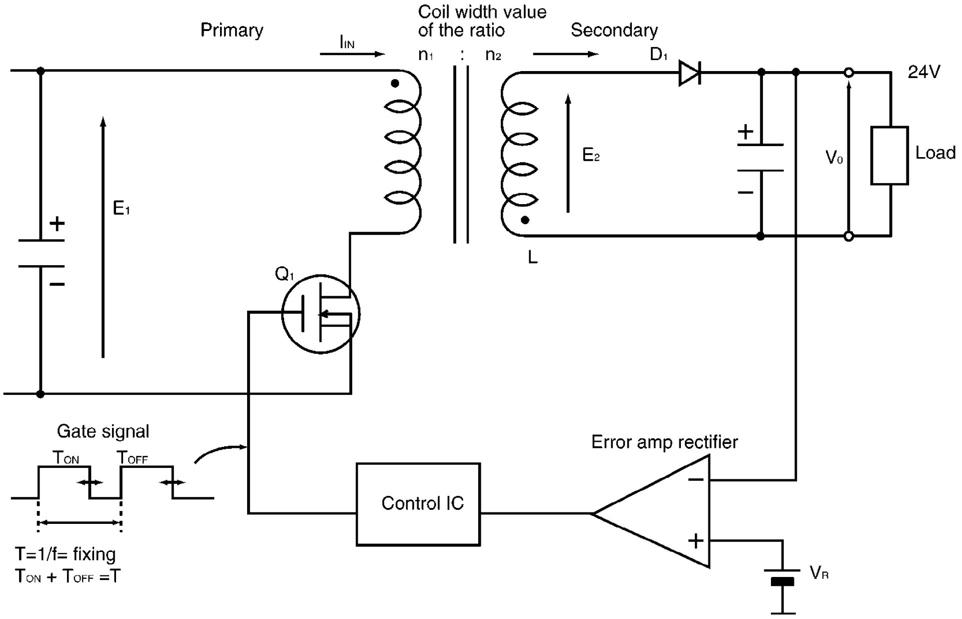
The input current goes into the input rectifier circuit through the filter circuit. The filter circuit decreases the noise voltage and the noise electric field strength.

[Rectifier Circuit]

The input current is rectified by D101,D102,D103 and D104 and charges C106 to make DC voltage. Then it supplies power to the converter circuit.

[Kick-on voltage circuit]

Bias is applied to the Q101 gate via this circuit when the AC power is turned on and Q101 begins operating.

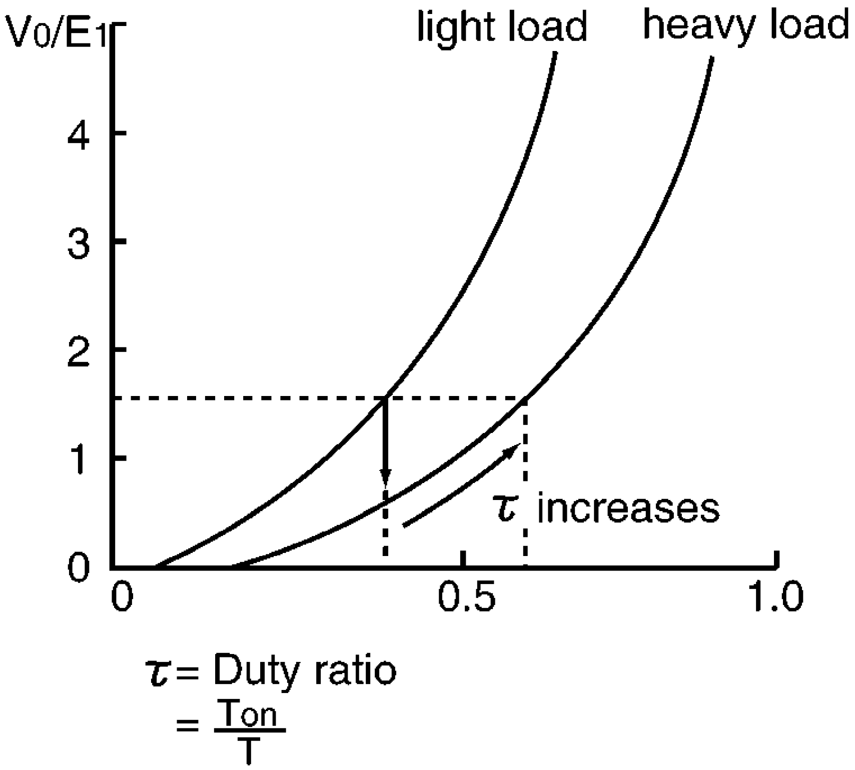

Primary
Coil width value
of the ratio
Secondary
I_{IN}
n_1 : n_2
D_1
24V
+
−
E_1
E_2
+
−
V_0
Load
L
Q_1
Gate signal
T_{ON}
T_{OFF}
T=1/f= fixing
T_{ON} + T_{OFF} =T
Control IC
Error amp rectifier
−
+
V_R

The following is an overview of how the power supply unit is controlled.
The control method of this power supply unit is pulse width modulation.
When Q_1 is ON, the energy is charged in the transfer primary coil according to E_1. When Q_1 is OFF, the energy is output from the secondary transfer as follows.

L → D_1 → Load → L

Then the power is supplied to the Load. When Q_1 is ON, power is not output from the secondary side. The output voltage is fed back in the control IC according to the error amp rectifier. Then depending on how T_{ON} is controlled, stabilization occurs. Also, when the current load becomes too large, in order to decrease the voltage output, the increase in τ is controlled and the output voltage is stabilized.
Therefore, basically the timing: Ton/Toff of Q1 controls the output voltage.

Output/Input voltage value of ratio



[Surge Absorber Circuit]

This circuit is for absorbing surge voltage generated by the transformer.

[Control Circuit and Detecting Circuit]

The control circuit amplifies the output with increased voltage detected in the error detecting circuit. Then it drives the main transistor.

In this power supply, the duty ratio is defined by changing the ON period of the main transistor. This is shown as follows.

When the output voltage of the 24V circuit increases, the current of the photo coupler PC101 increases, the pulse width of the output control IC becomes narrower and the ON period of Q101 becomes shorter.

[Over Current Limiter (O.C.L)]

The highest drain current (Q101) is limited by a limiter circuit (IC101) of 24V. The 24V output is limited by this circuit.

[Over Voltage Circuit]

If the 24V output increases because the error detecting circuit or control circuit is broken, IC101 will recognize this signal and output becomes 0V.

Dummy load method (to quickly check the power supply output)
Refer to Power Supply Board Section ().

9.14. CORDLESS SECTION (BASE UNIT)

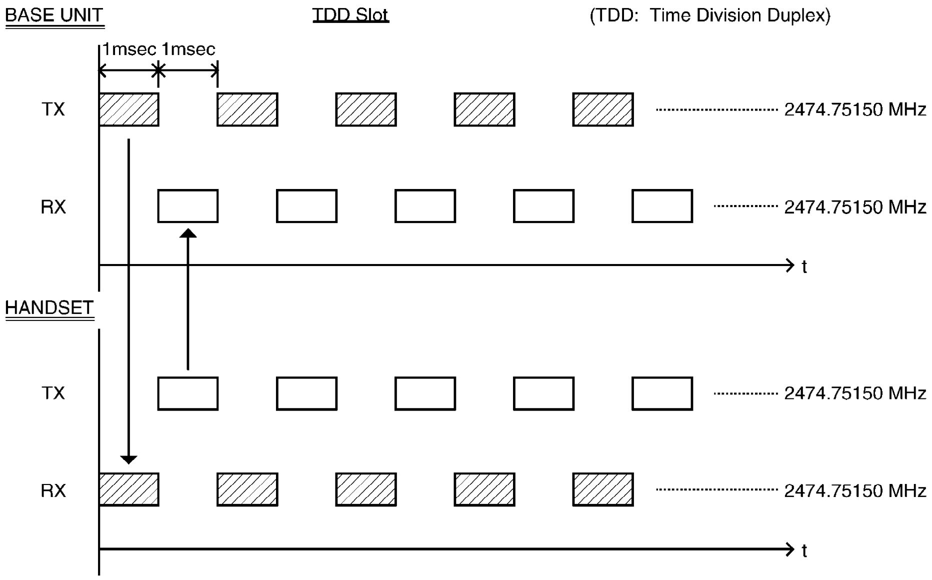
9.14.1. Description

9.14.1.1. Frequency

The frequency range of 2411.77625 MHz ~ 2479.87350 MHz is used. Transmitting and receiving channel between base unit and handset is same frequency. Refer to the Frequency Table.

9.14.1.2. Time Division Duplex (TDD) Operation

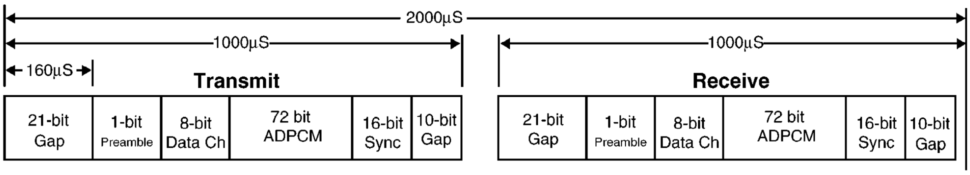
Transmission/reception between the base unit and handset is performed by time-sharing as shown in Fig. 7. 1 slot time of transmission and reception is 1mS. Same frequency is used in transmitting and receiving. The figure shows an example; the frequency of 3ch is used in transmitting between the base unit and handset.


BASE UNIT
TDD Slot
(TDD: Time Division Duplex)
1msec 1msec
TX
2474.75150 MHz
RX
2474.75150 MHz
t
HANDSET
TX
2474.75150 MHz
RX
2474.75150 MHz
t

9.14.1.3. TDD Frame Format

The TDD frame is 2mS in length. Each subframe contains 128 bits of 7.8 μ S duration. Each subframe consists of the following four fields:

- **A 1-bit Preamble field**
- **An 8-bit Data Channel field**
- **An 16-bit Sync Word**
- **A 72-bit ADPCM Payload (Parity 8-bit)**


2000µS
1000µS
1000µS
160µS
Transmit
Receive
21-bit Gap
1-bit Preamble
8-bit Data Ch
72 bit ADPCM
16-bit Sync
10-bit Gap
21-bit Gap
1-bit Preamble
8-bit Data Ch
72 bit ADPCM
16-bit Sync
10-bit Gap

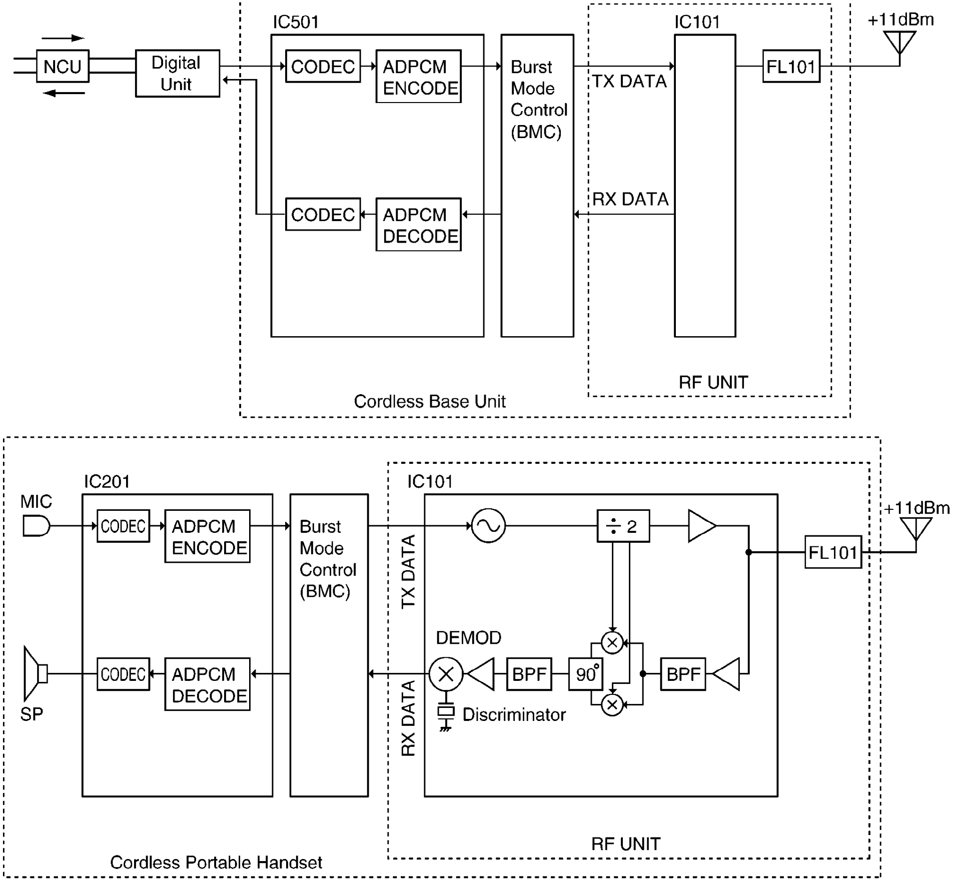
9.14.1.4. Signal Flow Chart in the Whole System

Reception

CN101 of the base unit is connected to the TEL line, and the signal is input through the NCU section and DIGITAL board then, led to DSP (IC501). DSP generates ADPCM signal. The ADPCM signal is input to RFIC (IC101) of RF UNIT, and is mixed with pseudo random noise code (PN code) to spread the spectrum. RFIC outputs FSK modulated RF signal. The RF signal is passed through filter (FL101) to be transmitted from the antenna. As for the handset, RF signal from the antenna is input to RFIC passing through filter (FL101) then input to DSP (IC501). DSP performs ADPCM decoding to convert the signal into the voice signal, then it is output to the speaker.

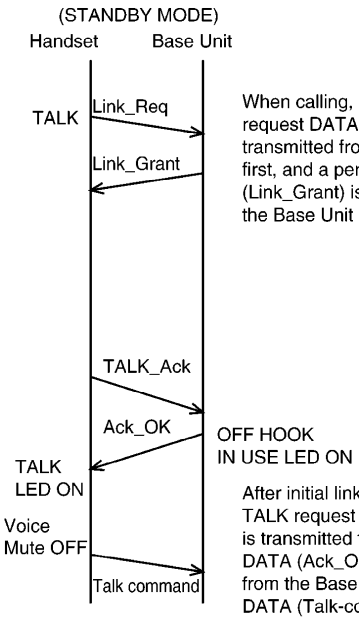
Transmission

The voice signal input from the microphone is led to DSP (IC201). The DSP generates ADPCM signal. As well as the reception, it is converted into the RF signal by RFIC (IC101). Passing through filter (FL101), it is transmitted from the antenna. As for the base unit, RF signal from the antenna is input to RFIC (IC101) passing through filter (FL101) then input to DSP (IC501). DSP performs ADPCM decoding to convert the signal into the voice signal. The voice signal is through the Digital board and the NCU section.


IC501
IC101
+11dBm
NCU
Digital Unit
CODEC
ADPCM ENCODE
Burst Mode Control (BMC)
TX DATA
FL101
CODEC
ADPCM DECODE
RX DATA
RF UNIT
Cordless Base Unit
IC201
IC101
MIC
CODEC
ADPCM ENCODE
Burst Mode Control (BMC)
TX DATA
÷ 2
+11dBm
FL101
DEMOD
BPF
90°
BPF
CODEC
ADPCM DECODE
RX DATA
Discriminator
SP
RF UNIT
Cordless Portable Handset

9.14.1.5. Explanation of BBIC (Base Band IC) Data Communication

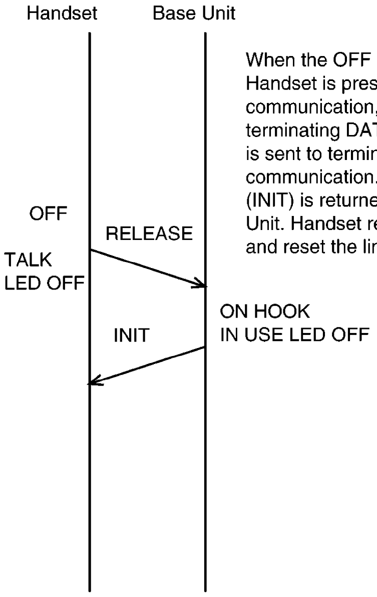
9.14.1.5.1. Calling


(STANDBY MODE)
Handset
Base Unit
TALK
Link_Req
Link_Grant
TALK_Ack
Ack_OK
OFF HOOK
IN USE LED ON
TALK
LED ON
Voice
Mute OFF
Talk command

When calling, a communication request DATA (Link_Req) is transmitted from the Handset first, and a permitting DATA (Link_Grant) is returned from the Base Unit to it.

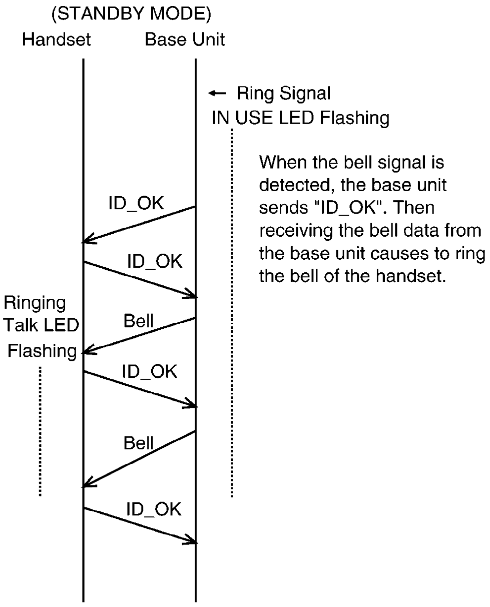
After initial link is established, TALK request DATA (Talk_Ack) is transmitted from the Handset. DATA (Ack_OK) is returned from the Base Unit to it, then DATA (Talk-command) is sent from the Handset. At that time the audio path opens.

9.14.1.5.2. To Terminate Communication


Handset
Base Unit
OFF
RELEASE
TALK
LED OFF
ON HOOK
IN USE LED OFF
INIT

When the OFF button on the Handset is pressed during communication, a LINK terminating DATA (RELEASE) is sent to terminate the communication. Then DATA (INIT) is returned from Base Unit. Handset receives Standby and reset the link.

9.14.1.5.3. Ringing


(STANDBY MODE)
Handset
Base Unit
Ring Signal
IN USE LED Flashing
When the bell signal is detected, the base unit sends "ID_OK". Then receiving the bell data from the base unit causes to ring the bell of the handset.
ID_OK
ID_OK
Ringing
Talk LED
Flashing
Bell
ID_OK
Bell
ID_OK

9.14.1.5.4. Ports for Transmitting and Receiving of Data

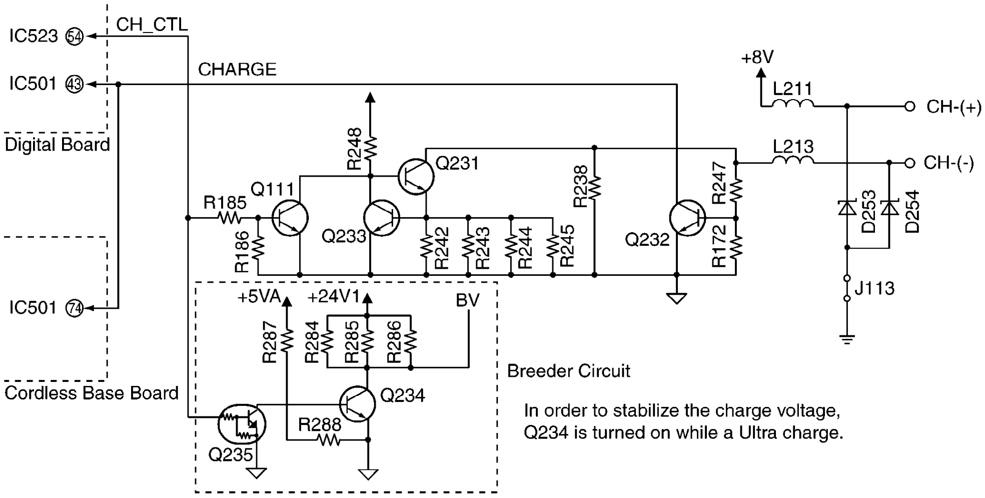
Handset: (IC201)
Transmitting: Pin 57 (TXO), Pin 64 (TXEN)
Receiving: Pin 66 (RXI), Pin 63 (RXEN)

Base Unit: (IC501)
Transmitting: Pin 57 (TXO), Pin 64 (TXEN)
Receiving: Pin 66 (RXI), Pin 63 (RXEN)

9.14.2. Charge Circuit (on Analog Board)

Ultra charge (135 mA) of maximum 9 hours is started soon after the Handset is placed on the base unit. Finally the mode changes to trickle charge (20 mA) to prevent overcharging.

Circuit Diagram


IC523 ㊹
CH_CTL
IC501 ㊸
CHARGE
Digital Board
IC501 ㊹
Cordless Base Board
+8V
L211
CH-(+)
L213
CH-(-)
R248
Q231
R238
R247
R185
Q111
Q233
R186
R242
R243
R244
R245
Q232
R172
D253
D254
J113
+5VA
+24V1
BV
R287
R284
R285
R286
Q234
R288
Q235

Breeder Circuit

In order to stabilize the charge voltage, Q234 is turned on while a Ultra charge.

9.14.3. Line Sending Signal

Refer to Signal Flow Chart in the Whole System ().

9.14.4. Line Receiving Signal

Refer to Signal Flow Chart in the Whole System ().

9.14.5. Cordless Base Board Block Diagram

9.15. CORDLESS SECTION (HANDSET)

9.15.1. Block Diagram

9.15.1.1. Construction

The circuit mainly consists of DSP and RF unit as shown in the block diagram.

9.15.1.2. DSP: IC201

Function

- Battery Low, Power down detect circuit

- Ringer Generation

- Interface circuit

RF unit, speaker, mic, LED, Key scan, LCD, Headset

9.15.1.3. RF Unit

Mainly voice signal is modulated to RF, or it goes the other way.

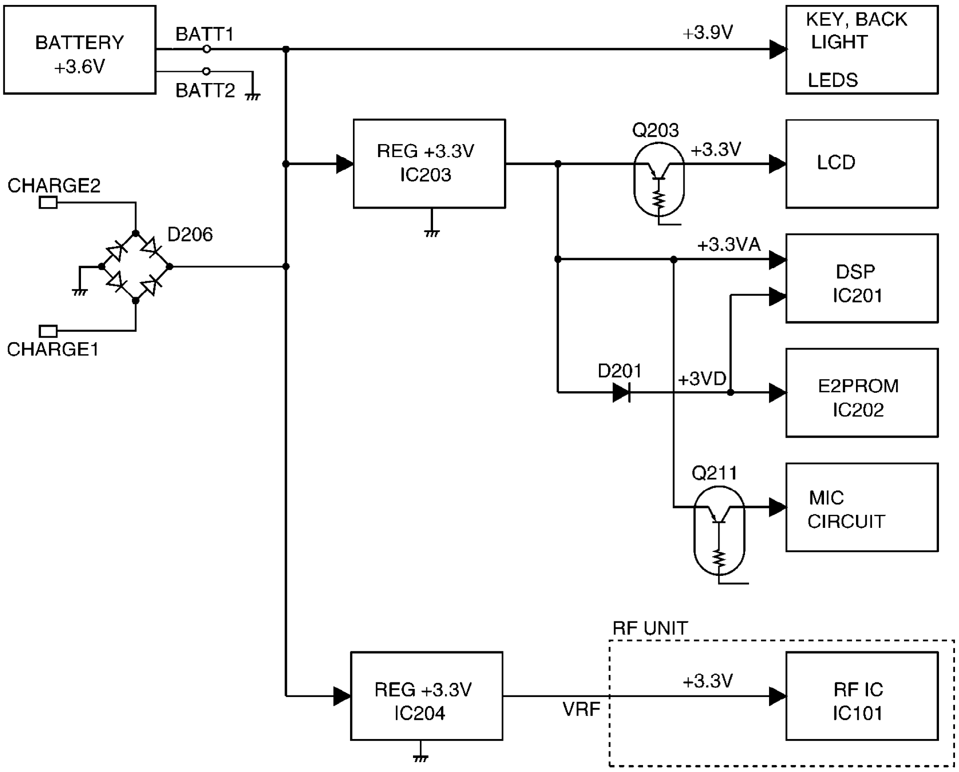
9.15.1.4. EEPROM: IC202

All setting data is stored.
ex: ID code, user setting (Flash Time, Tone/Pulse)

9.15.1.5. Power Supply Circuit

Voltage is supplied separately to each block.

Circuit Diagram (Handset Power)


BATTERY
+3.6V
BATT1
BATT2
+3.9V
KEY, BACK LIGHT
LEDS
REG +3.3V
IC203
Q203
+3.3V
LCD
CHARGE2
D206
CHARGE1
+3.3VA
DSP
IC201
D201
+3VD
E2PROM
IC202
Q211
MIC CIRCUIT
RF UNIT
REG +3.3V
IC204
VRF
+3.3V
RF IC
IC101

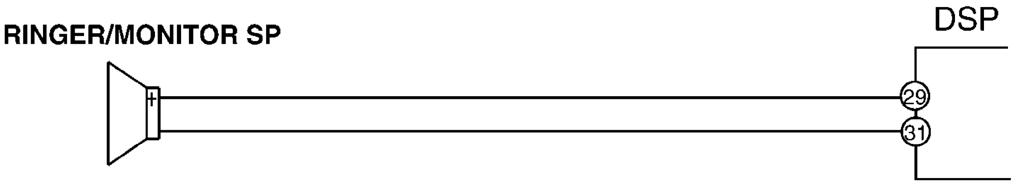
9.15.1.6. Charge Circuit

Ni-Cd battery is connected to (BATT+, BATT-). When the handset is put on the cradle of the base unit, the power is supplied from CHARGE1 and CHARGE2 terminals to charge the battery. Q207 detects the voltage of CHARGE1 and CHARGE2 terminals, then the handset makes ID code setting (*) with the base unit.

9.15.1.7. Ringer and Handset SP-Phone

DSP (29-31) → SP/RINGER

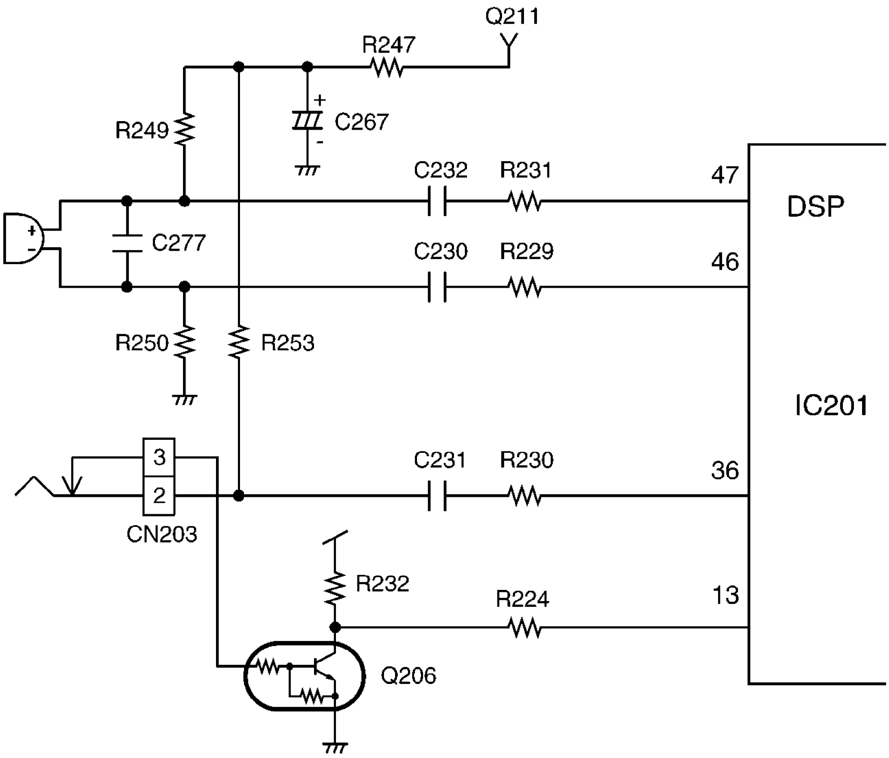
Circuit Diagram


RINGER/MONITOR SP
DSP
29
31

9.15.1.8. Sending Signal

The voice signal from the microphone input to DSP (46-47). CN203 is the headphone jack. When the headphone is connected, the Q206 detect it. The input from the microphone of the handset (MIN, MIP) is cut and the microphone signal from the headphone is input to DSP (36). Also the power for the microphone is supplied from Q211, and the power is turned OFF on standby.

Circuit Diagram


Q211
R247
R249
C267
C232
R231
47
DSP
C277
C230
R229
46
R250
R253
IC201
3
2
CN203
C231
R230
36
R232
R224
13
Q206

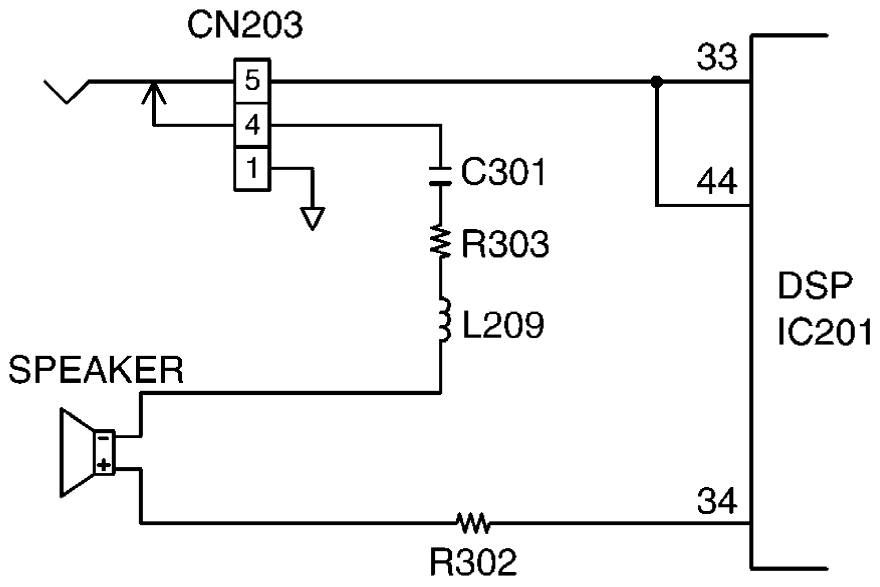
Note: DSP is IC201.
See CPU DATA (Handset) ().

9.15.1.9. Reception Signal

The voice signal from the base unit is output to DSP (33) (HSSOUT). This signal is led to the headset jack (CN203) and DSP (44) (HSMIP). The signal input to DSP (44) is inverted and output

to DSP (34) (LOUTO).The signal through the headset jack is inverted, then output from DSP (34) to drive the speaker. When the headset is inserted to the jack, the voice signal is cut at the jack, so the sound does not come out from the speaker, but from the headset only.

Circuit Diagram


CN203
5
4
1
33
44
C301
R303
L209
DSP
IC201
SPEAKER
34
R302

9.16. CPU DATA (Cordless Base Board)

9.16.1. IC501

Pin	Description	I/O	High	High_Z	Low
1	CBUSY1	D.O	High	--	Low
2	CBUSY2	D.I	High	--	Low
3	CSI	D.O	High	--	Low
4	CCLK	D.O	High	--	Low
5	CSO	D.I	High	--	Low
6	S_ENB	D.O	High	--	Low
7	NC	D.O	--	--	--
8	EEP_DI	D.O	High	--	Low
9	EEP_DO	D.I	High	--	Low
10	EEP_CS	D.O	High	--	Low
11	EEP_CLK	D.O	High	--	Low
12	NC	D.O	--	--	--
13	NC	D.O	--	--	--
14	VCC	VCC	Vcc	--	--
15	GND	GND	--	--	GND
16	NC	--	--	--	--
17	NC	--	--	--	--
18	NC	--	--	--	--
19	NC	--	--	--	--
20	NC	--	--	--	--
21	NC	--	--	--	--
22	NC	--	--	--	--
23	SIOD0	D.O			
24	SIOALE	D.O			
25	SIOCLK	D.O			
26	RESET	D.O	--	--	Normal
27	NC	--	--	--	--
28	GND	GND	--	--	GND
29	NC	--	--	--	--
30	GNDPA	GND	--	--	GND
31	NC	--	--	--	--
32	VCCPA	VCC	VCC	--	--
33	NC	--	--	--	--
34	LOUT0	A.O	--	--	--
35	NC	--	--	--	--
36	LIN0	A.I	--	--	--
37	LGS0	A.I	--	--	--
38	NC	--	--	--	--
39	NC	--	--	--	--
40	NC	--	--	--	--
41	VCCA	VCC	VCC	--	--
42	DCIN1	GND	--	--	GND
43	GNDA	GND	--	--	GND
44	NC	--	--	--	--
45	VREF	A.O	--	--	--
46	NC	--	--	--	--
47	NC	--	--	--	--
48	DCIN2	A.I	--	--	--
49	GNDPLL	GND	--	--	GND
50	VCCPLL	VCC	VCC	--	--

Pin	Description	I/O	High	High_Z	Low
51	XOUT	A.O	--	--	--
52	XIN	A.I	--	--	--
53	GND	GND	--	--	GND
54	RSTN	D.I	Normal	--	Reset
55	PDN	D.I	Power On	--	Power Down
56	CE	D.O	Not	--	Active
57	TXOUT	D.O	High	--	Low
58	RXGAIN	D.I	HIGH_GAIN	--	LOW_GAIN
59	ALE	D.O	High	--	Low
60	CLE	D.O	High	--	Low
61	NC	D.O	--	--	Normal
62	RSTH	D.O	Normal	--	Wakeup
63	RXEN	D.O	Enable	--	Disable
64	TXEN	D.O	Enable	--	Disable
65	SHCTRL	D.O	High	--	Low
66	RXI	D.I	High	--	Low
67	NC	--	--	--	--
68	NC	--	--	--	--
69	NC	--	--	--	--
70	NC	--	--	--	--
71	NC	--	--	--	--
72	GND	GND	--	--	GND
73	VCC	VCC	VCC	--	--
74	CHARGE_DET	D.I	Off Charge	--	On Charge
75	TCK	D.O			
76	TMS	D.O			
77	TDI	D.I			
78	TDO	D.O			
79	NC	--	--	--	--
80	NC	--	--	--	--
81	WP	D.O	Not	--	Active
82	NC	--	--	--	--
83	NC	--	--	--	--
84	NC	--	--	--	--
85	NC	--	--	--	--
86	NC	--	--	--	--
87	NC	--	--	--	--
88	IO7	D.O	High	--	Low
89	IO6	D.O	High	--	Low
90	IO5	D.O	High	--	Low
91	IO4	D.O	High	--	Low
92	IO3	D.O	High	--	Low
93	IO2	D.O	High	--	Low
94	IO1	D.O	High	--	Low
95	IO0	D.O	High	--	Low
96	GND	GND	--	--	GND
97	VCC	VCC	VCC	--	--
98	RE	D.O	--	Not	Active
99	WE	D.O	--	Not	Active
100	PCTRL	D.O	High Power	--	Low Power

9.17. CPU DATA (Handset)

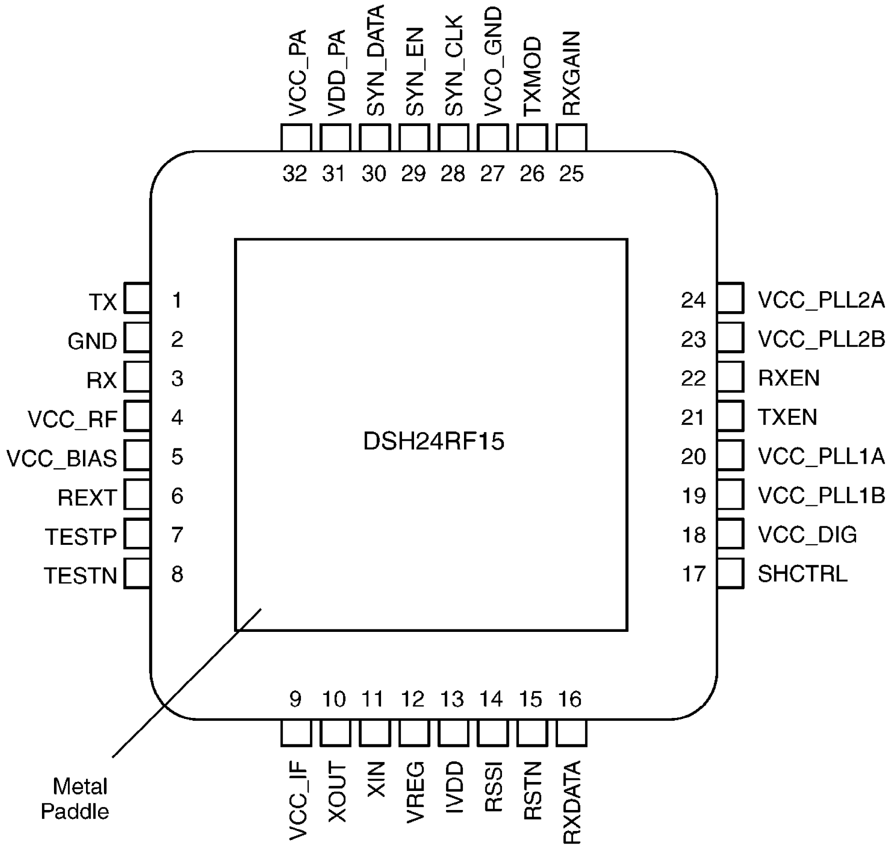
9.17.1. IC201

Pin	Description	I/O	High	High_Z	Low
1	NC	D.O	--	--	Normal
2	NC	D.O	--	--	Normal
3	UART_RX	D.I	High	--	Low
4	UART_TX	D.O	High	--	Low
5	LCD POWER_SW	D.O	Off	--	On
6	KEY STROBE_F	D.O	--	Not	Active
7	KEY STROBE_E	D.O	--	Not	Active
8	KEY STROBE_D	D.O	--	Not	Active
9	KEY STROBE_C	D.O	--	Not	Active
10	KEY STROBE_B	D.O	--	Not	Active
11	KEY STROBE_A	D.O	--	Not	Active
12	NC	D.O	--	--	Normal
13	HEADSET_DET	D.I	Headset In	--	Non
14	VCC	VCC	Vcc	--	--
15	GND	GND	--	--	GND
16	DOT_DB4	D.O	High	--	Low
17	DOT_DB5	D.O	High	--	Low
18	DOT_DB6	D.O	High	--	Low
19	DOT_DB7	D.O	High	--	Low
20	DOT_E/RD	D.O	Active	--	Not
21	DOT_RW/WR	D.O	Read	--	Write
22	DOT_RS	D.O	Data	--	Instruction
23	SIODO_RF	D.O	High	--	Low
24	SIOLE_RF	D.O	Latch	--	Latch
25	SIOCLK_RF	D.O	High	--	Low
26	NC	D.O	--	--	Normal
27	DOT_RESET	D.O	Not	--	Reset
28	GND	GND	--	--	GND
29	SPOUTP	A.O	--	--	--
30	GNDPA	GND	--	--	GND
31	SPOUTN	A.O	--	--	--
32	VCCPA	VCC	VCC	--	--
33	HSSPOUT	A.O	--	--	--
34	LOUT0	A.O	--	--	--
35	DCIN0	A.I	--	--	--
36	LIN0	A.I	--	--	--
37	LGS0	A.I	--	--	--
38	CIDO0	A.I	--	--	--
39	CIDIN0	A.I	--	--	--
40	CIDIP0	A.I	--	--	--
41	VCCA	VCC	VCC	--	--
42	DCIN1	A.I	--	--	--
43	GNDA	GND	--	--	GND
44	HSMIP	A.I	--	--	--
45	VRFF	A.O	--	--	--
46	MIN	A.I	--	--	--
47	MIP	A.I	--	--	--
48	RSSI	A.I	--	--	--
49	GNDPLL	GND	--	--	GND
50	VCCPLL	VCC	VCC	--	--

Pin	Description	I/O	High	High_Z	Low
51	XOUT	A.O	--	--	--
52	XIN	A.I	--	--	--
53	GND	GND	--	--	GND
54	RSTN	D.I	Normal	--	Reset
55	PDN	D.I	Power On	--	Power Down
56	MIC_POWSW	D.O	Bias Off	--	Bias On
57	TX0	D.O	High	--	Low
58	RXGAIN	D.I	HIGH_GAIN	--	LOW_GAIN
59	EEPROM_DO	D.I	High	--	Low
60	EEPROM_DI	D.O	High	--	Low
61	NC	D.O	--	--	Normal
62	RSTH	D.O	Normal	--	Wakeup
63	RXEN	D.O	High	--	Low
64	TXEN	D.O	High	--	Low
65	SHCTRL	D.O	High	--	Low
66	RXI	D.I	High	--	Low
67	EEPROM_CS	D.O	Active	--	Not
68	NC	D.O	--	--	Normal
69	LITED LED	D.O	On	--	Off
70	TALK LED	D.0	Off	--	On
71	RADIOEN	D.0	On	--	Off
72	GND	GND	--	--	GND
73	VCC	VCC	VCC	--	--
74	CHAGE DET	D.I	Off Charge	--	On Charge
75	TCK	D.O			
76	TMS	D.O			
77	TDI	D.I			
78	TDO	D.O			
79	RECHAGE LED	D.O	Off	--	On
80	INTLED	D.O	Off	--	On
81	NC	D.O	Normal	--	--
82	KEYIN_5	D.I	Non	--	Key In
83	KEYIN_4	D.I	Non	--	Key In
84	KEYIN_3	D.I	Non	--	Key In
85	KEYIN_2	D.I	Non	--	Key In
86	KEYIN_1	D.I	Non	--	Key In
87	NC	D.O	Normal	--	--
88	LCD_BL	D.O	On	--	Off
89	NC	D.O	--	--	Normal
90	NC	D.O	--	--	Normal
91	NC	D.O	--	--	Normal
92	NC	D.O	--	--	Normal
93	NC	D.O	--	--	Normal
94	NC	D.O	--	--	Normal
95	NC	D.O	--	--	Normal
96	GND	GND	--	--	GND
97	VCC	VCC	VCC	--	--
98	NC	D.O	Normal	--	--
99	EPP_CLK	D.O	High	--	Low
100	POWCTRL	D.O	--	--	Normal

9.18. EXPLANATION OF RF UNIT TERMINALS

9.18.1. IC101

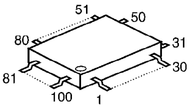
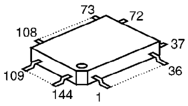
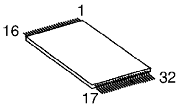
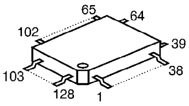
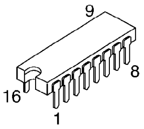
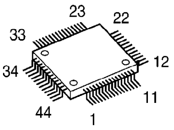
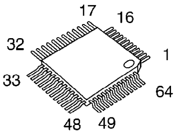
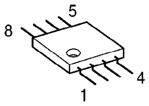
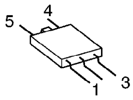
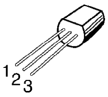
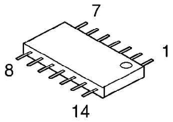
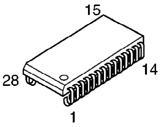
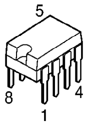
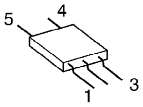
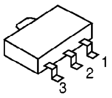
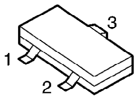
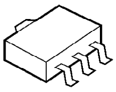
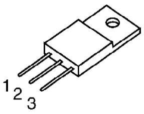
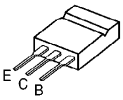
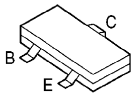
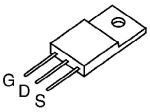
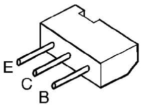
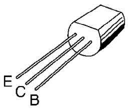
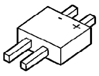
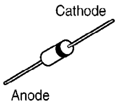
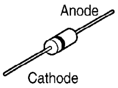
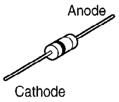
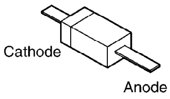
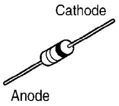
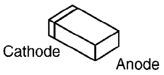
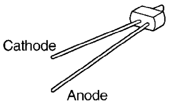
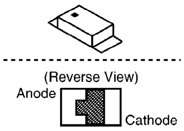
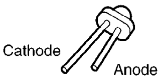

VCC_PA
VDD_PA
SYN_DATA
SYN_EN
SYN_CLK
VCO_GND
TXMOD
RXGAIN
32 31 30 29 28 27 26 25
TX 1
GND 2
RX 3
VCC_RF 4
VCC_BIAS 5
REXT 6
TESTP 7
TESTN 8
24 VCC_PLL2A
23 VCC_PLL2B
22 RXEN
21 TXEN
20 VCC_PLL1A
19 VCC_PLL1B
18 VCC_DIG
17 SHCTRL
DSH24RF15
9 10 11 12 13 14 15 16
VCC_IF
XOUT
XIN
VREG
IVDD
RSSI
RSTN
RXDATA
Metal
Paddle

Pin	Description	I/O
1	TX	O&VCC
2	GND_RF	GND
3	RX	I
4	VCC_RF	VCC
5	VCC_BIAS	VCC
6	REXT	I
7	TESTP	O
8	TESTN	O
9	VCC_IF	VCC
10	XOUT	XI/XO
11	XIN	XI/XO
12	VREG	O
13	VDD	I
14	RSSI	O
15	RSTN	I
16	RXDATA	O

Pin	Description	I/O
17	SHCTRL	I
18	VCC_DIG	VCC
19	VCC_PLL1B	VCC
20	VCC_PLL1A	VCC
21	TXEN	I
22	RXEN	I
23	VCC_PLL2B	VCC
24	VCC_PLL2A	VCC
25	RXGAIN	O
26	BCLK	O
27	TXMOD	I
28	SYN_CLK	I
29	SYN_EN	I
30	SYN_DATA	I
31	VDD_PA	I
32	VCC_PA	VCC
PKG	PADDLE_GND	GND

10. REFERENCE MATERIAL DATA

10.1. TERMINAL GUIDE OF THE ICs TRANSISTORS AND DIODES

 51 50 80 31 30 81 100 1 C2HBBG000092 C2HBBG000093	 73 72 108 37 109 36 144 1 C1ZBZ0001896	 PFWIFPG376M C3FAKC000008	 65 64 102 39 103 38 128 1 PFVIR675813	 PFVIT2003APS
 23 22 33 12 34 11 44 1 C1ZBZ0002089	 17 16 32 1 33 64 48 49 C1ZBZ0002029	 PFVTSI4431DY, PQVINJM4558M PQVIMC34119M, PQVIS93C56DJ C0AABB000025, PQVINJM4580M PFWIFPG371MR		 PFVII5510011
 AN1431T	 PQVITC4066BF	 C3ABKC000027	 PFVIFA5317P	 PQVIMM1385EN
 C0CBABD00011	 C0EBF0000157	 C0CBABD00013 C0CBABD00017	 PFVIPQ05RD11 PFVDSF5LC20U	 2SD21360R
 PQVTDTC143E, PQVTDTA143TU 2SD1819A, 2SB1197KQ, 2SC4081S 2SC39300CL, UN5117, UN5213		 2SK2543	 2SB1322	 2SC2235
 PQVDMD5S PFVDDGS1ZB60	 Cathode Anode 1SS119	 Anode Cathode PFVD21DQ10 PQVDERA1802 PFVDAG01A, MA165	 Anode Cathode MA4220, PFVD1N4005 MA7160, MAZ43000MF	 Cathode Anode MA2J11100L
 Cathode Anode MA4056 PFVDRMRLS245	 Cathode Anode MAZ81000M PQVDHRU0302A MA2ZD1400	 Cathode Anode PQVDSLR325MC	 (Reverse View) Anode Cathode PQVDSML310MT	 Cathode Anode LNJ801LPDJA

10.2. HOW TO REPLACE THE FLAT PACKAGE IC

Even if you do not have the special tools (for example, a spot heater) to remove the Flat IC, with some solder (large amount), a soldering iron and a cutter knife, you can easily remove the ICs that have more than 100 pins.

10.2.1. Preparation

10.2.1.1. For Power Supply Board

- SOLDER

Sparkle Solder 115A-1, 115B-1 OR Almit Solder KR-19, KR-19RMA

- Soldering iron

  Recommended power consumption is between 30 W to 40 W.
  Temperature of Copper Rod 662 ± 50°F (350 ± 10°C)
  (An expert may handle a 60~80 W iron, but a beginner might damage the foil by overheating.)
- Flux

  HI115 Specific gravity 0.863
  (Original flux should be replaced daily.)

10.2.1.2. For P. C. Board with “PbF” marking

- PbF (: Pb free) Solder
- Soldering Iron

  Tip Temperature of 662°F ± 50°F (350°C ± 10°C)
  Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.
- Flux

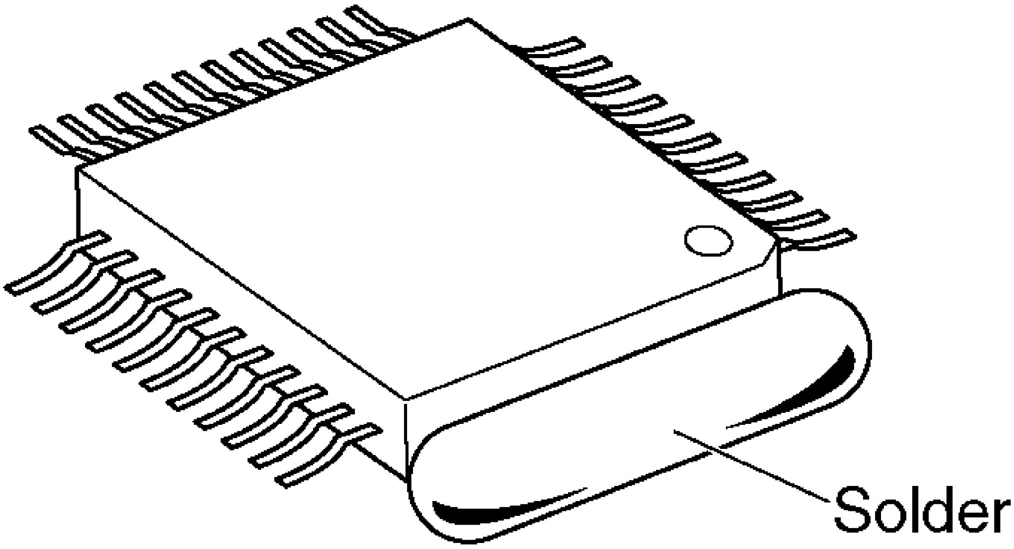
  Recommended Flux: Specific Gravity → 0.82.
  Type → RMA (lower residue, non-cleaning type)

Note: See ABOUT LEAD FREE SOLDER (PbF: Pb free) ().

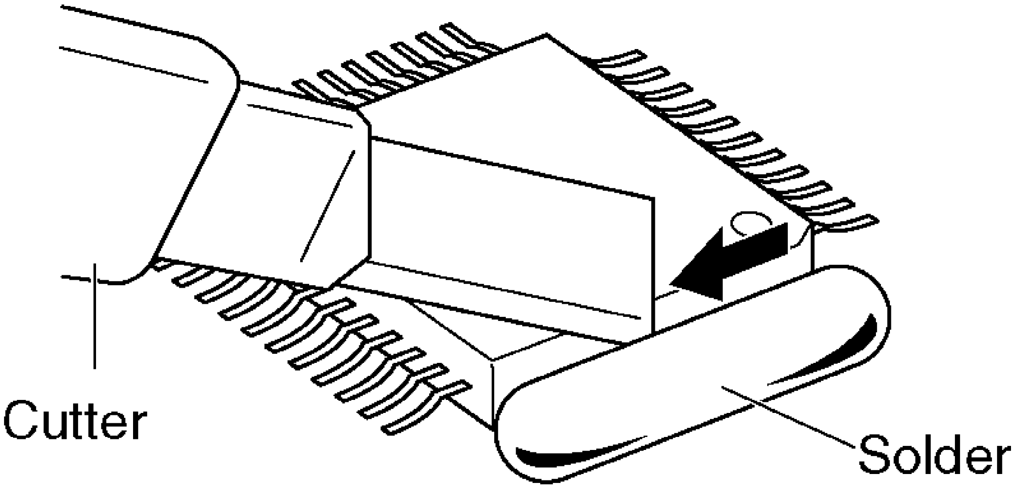
10.2.2. Flat Package IC Removal Procedure

1. Put plenty of solder on the IC pins so that the pins can be completely covered.

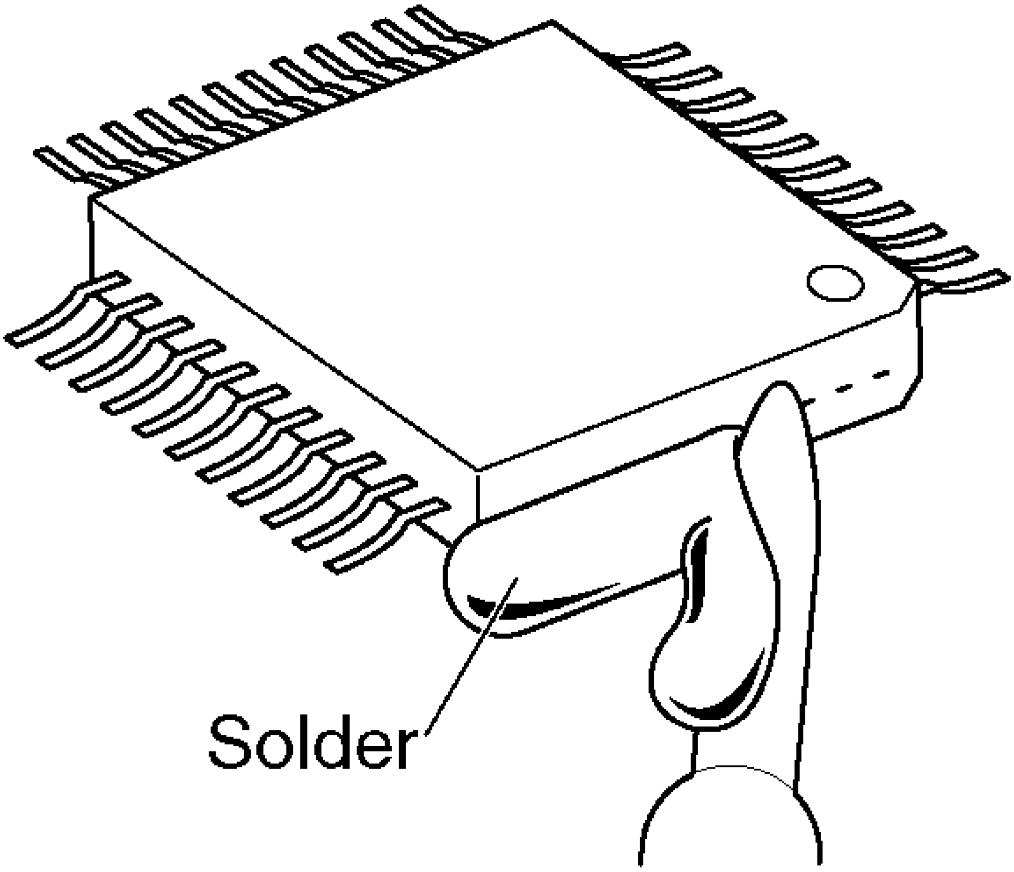
Note:
If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



2. Make a few cuts into the joint (between the IC and its pins) first and then cut off the pins thoroughly.


Cutter
Solder

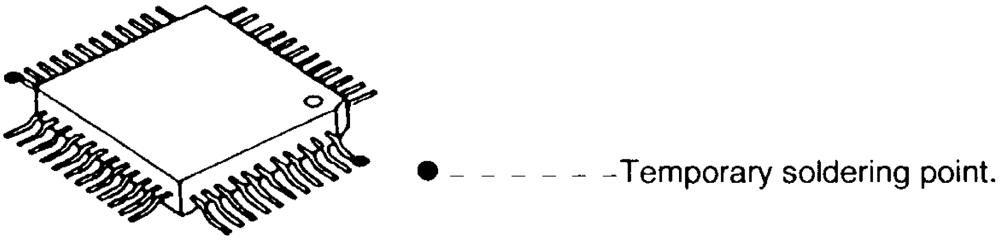
3. While the solder melts, remove it together with the IC pins.



When you attach a new IC to the board, remove all solder left on the land with some tools like a soldering wire. If some solder is left at the joint on the board, the new IC will not be attached properly.

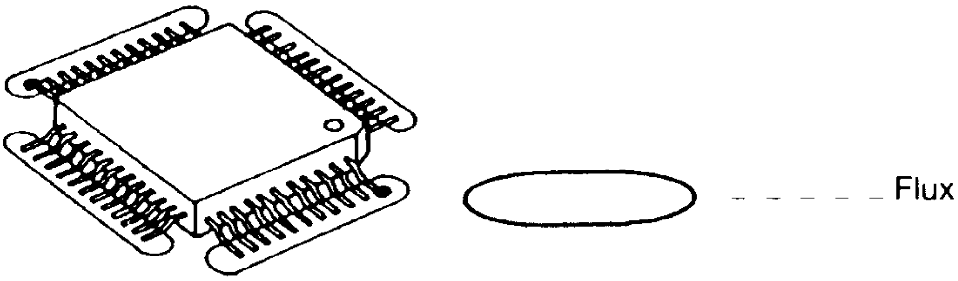
10.2.3. Flat Package IC Installation Procedure

1. Temporarily fix the FLAT PACKAGE IC, soldering the two marked pins.

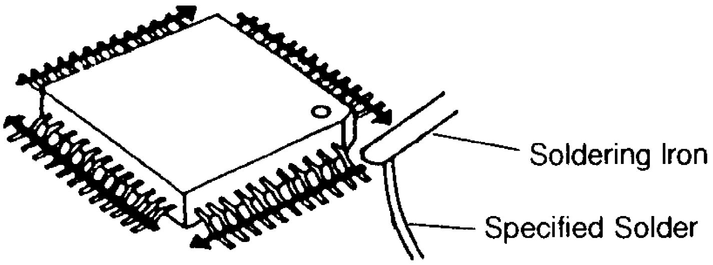


***Check the accuracy of the IC setting with the corresponding soldering foil.**

2. Apply flux to all pins of the FLAT PACKAGE IC.

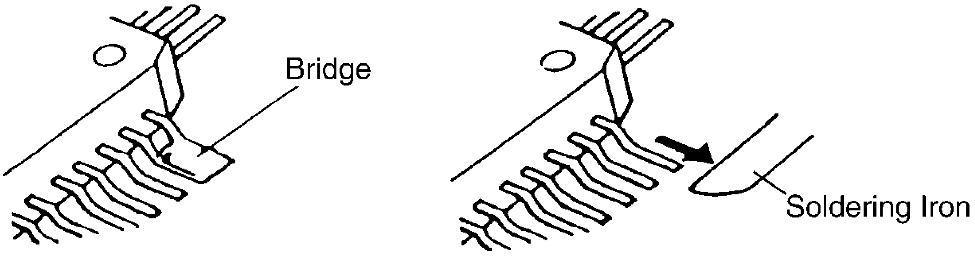


3. **Solder the pins, sliding the soldering iron in the direction of the arrow.**


Soldering Iron
Specified Solder

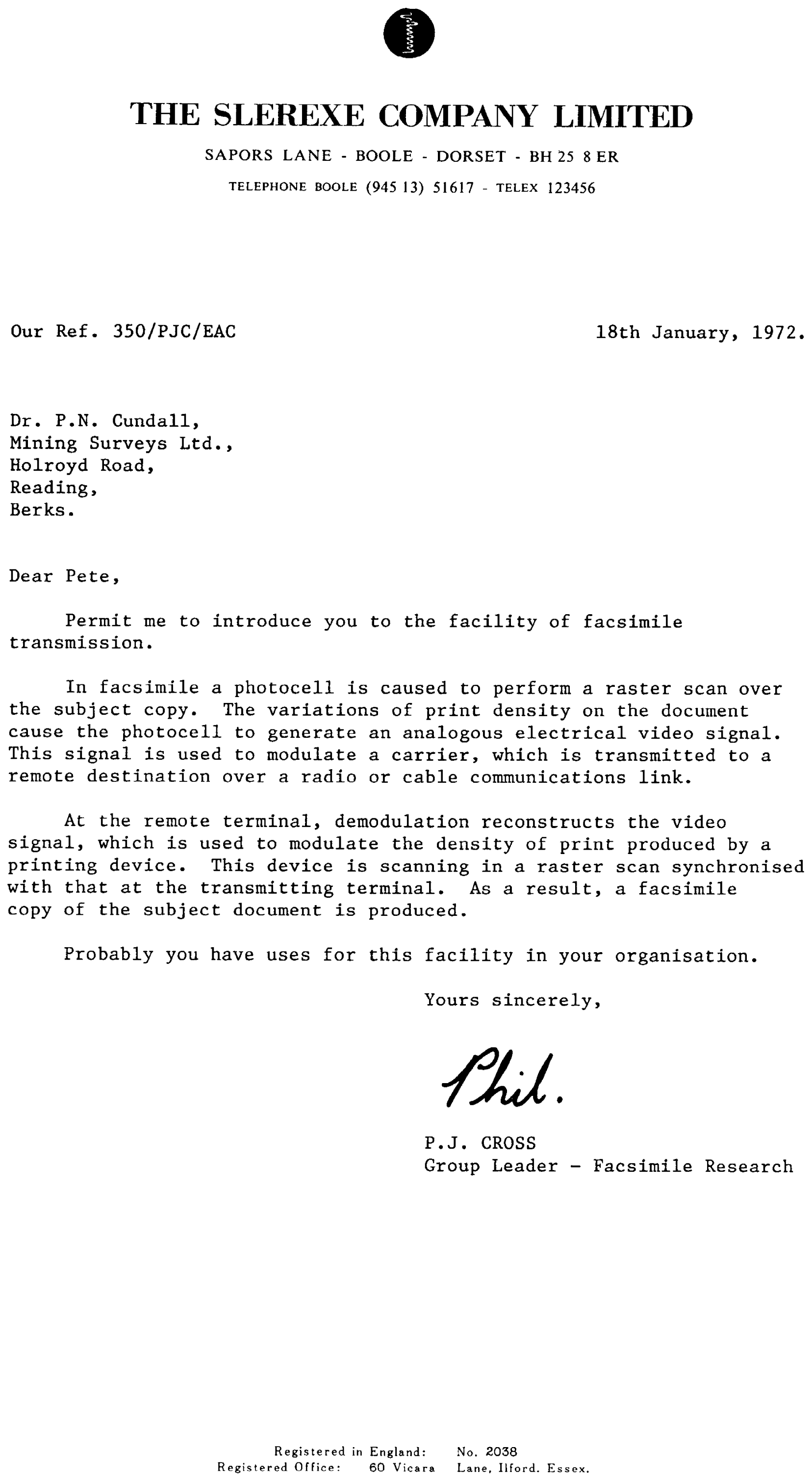
10.2.4. Bridge Modification Procedure

1. **Lightly resolder the bridged portion.**
2. **Remove the remaining solder along the pins using a soldering iron as shown in the figure below.**


Bridge
Soldering Iron

10.3. TEST CHART

10.3.1. ITU-T No.1 Test Chart



THE SLEREXE COMPANY LIMITED
SAPORS LANE - BOOLE - DORSET - BH 25 8 ER
TELEPHONE BOOLE (945 13) 51617 - TELEX 123456

Our Ref. 350/PJC/EAC 18th January, 1972.

Dr. P.N. Cundall,
Mining Surveys Ltd.,
Holroyd Road,
Reading,
Berks.

Dear Pete,

Permit me to introduce you to the facility of facsimile transmission.

In facsimile a photocell is caused to perform a raster scan over the subject copy. The variations of print density on the document cause the photocell to generate an analogous electrical video signal. This signal is used to modulate a carrier, which is transmitted to a remote destination over a radio or cable communications link.

At the remote terminal, demodulation reconstructs the video signal, which is used to modulate the density of print produced by a printing device. This device is scanning in a raster scan synchronised with that at the transmitting terminal. As a result, a facsimile copy of the subject document is produced.

Probably you have uses for this facility in your organisation.

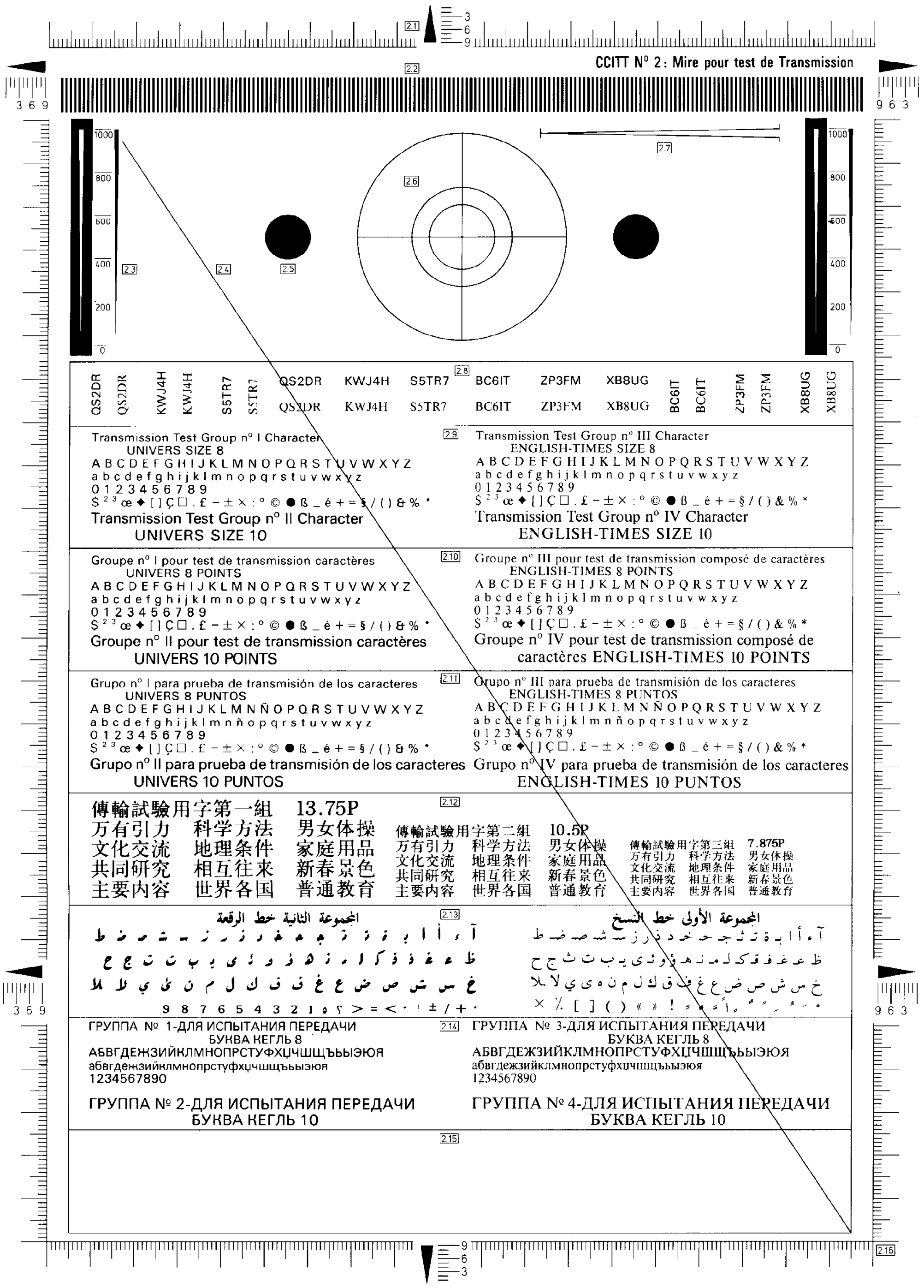
Yours sincerely,

Phil.

P.J. CROSS
Group Leader - Facsimile Research

Registered in England: No. 2038
Registered Office: 60 Vicara Lane, Ilford. Essex.

10.3.2. ITU-T No.2 Test Chart


CCITT N° 2: Mire pour test de Transmission

10.4. openLCR SERVICE for CALLER IQ FEATURE

This unit is compatible with the openLCR service.
The openLCR feature will compare your long-distance plan and route your call if lower rates are available. This service is offered on a call-by-call basis and can save you up to 50% on your long -distance telephone and fax calls.

Trademarks:

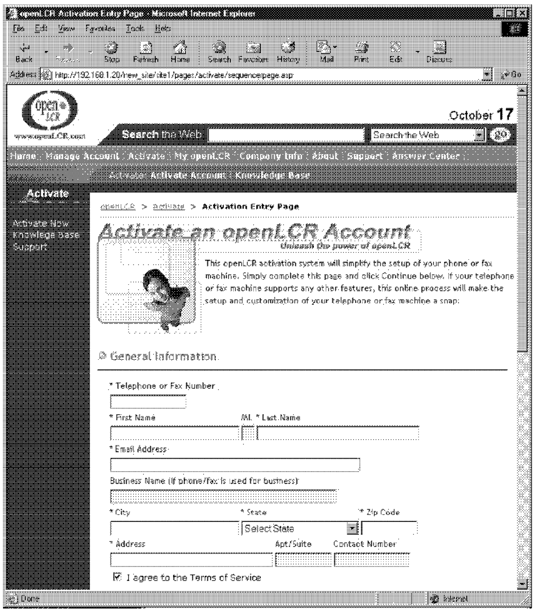
- **openLCR, openLCR.com, and the openLCR logo are the trademarks of openLCR.com, Inc.**
- **All other trademarks identified herein are the property of their respective owners.**

10.4.1. Setup

10.4.1.1. Through openLCR Web Site

To activate all of the Caller IQ features shown on "Instructions from openLCR for activating the Caller IQ features", proceed as follow:
go to www.openLCR.com and click on [Activate openLCR].

- **After registering, you must download the rate table (see Update ()) to activate service.**
- **A long distance bill may be sent to you from each of the low cost carriers that is used.**


openLCR Activation Entry Page - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://192.168.1.20/new_site/site1/pages/activate/sequencerpage.asp
Go
www.openLCR.com
October 17
Search the Web
Search the Web
go
Home Manage Account Activate My openLCR Company Info About Support Answer Center
Activate: Activate Account Knowledge Base
Activate
Activate Now
Knowledge Base
Support
openLCR > Activate > Activation Entry Page
Done
Internet

Activate an openLCR Account

Unleash the power of openLCR

This openLCR activation system will simplify the setup of your phone or fax machine. Simply complete this page and click Continue below. If your telephone or fax machine supports any other features, this online process will make the setup and customization of your telephone or fax machine a snap.

General Information

* Telephone or Fax Number

* First Name

M.I.

* Last Name

* Email Address

Business Name (if phone/fax is used for business)

* City

* State Select State

* Zip Code

* Address

Apt/Suite

Contact Number

☑ I agree to the Terms of Service

Note:

- **If the display shows the following when downloading the rate table, your facsimile telephone number is not registered to openLCR.**

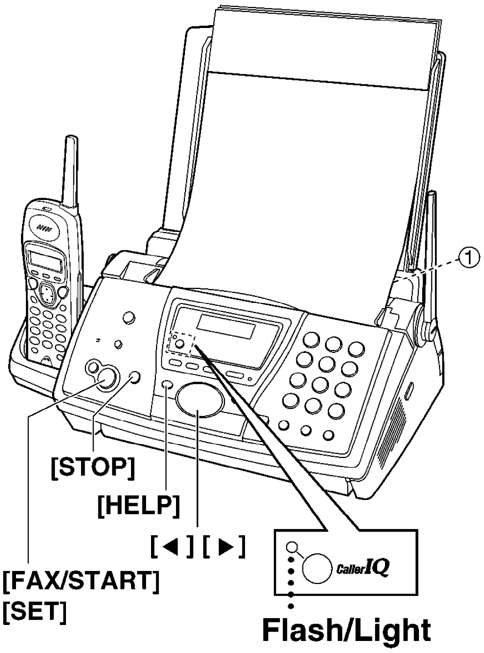
```
DOWNLOAD ERROR
PRESS CALLERIQ,#
```

Please register your facsimile telephone number through "call openLCR" on By phone (call openLCR) ().

10.4.1.2. By fax (fax openLCR)

This method activates the Information Download*1, the Low Cost Routing feature and automatically sets the date and time. With this activation method, you can also confirm that the setup of your fax machine is correct (fax transmission test).
***1Activating the Information Download by faxing openLCR will download a default setting. To customize your Information Download, go to the openLCR web site at www.openLCR.com.**

- A long distance bill may be sent to you from each low cost carriers used.



1. Fill in the openLCR Registration Form sheet (enclosed).

2. Insert the sheet FACE DOWN (①) into the feeder.

3. Press [CALLER IQ].

4. Press [◄] or [►] repeatedly "FAX OPENLCR", or press [5].

5. Press [FAX/START].

- Your fax machine will send the sheet to openLCR with the "FINE" resolution automatically.
- If the sheet is successfully transmitted, it will be sent back to you on the same connection to let you confirm that your setup is correct.

- **The CALLER IQ indicator will flash and your fax machine will automatically receive the rate table.**
- **When the rate table download is completed, the CALLER IQ indicator will stop flashing but will remain lit up and the display will show "DOWNLOAD OK!"**

To stop downloading

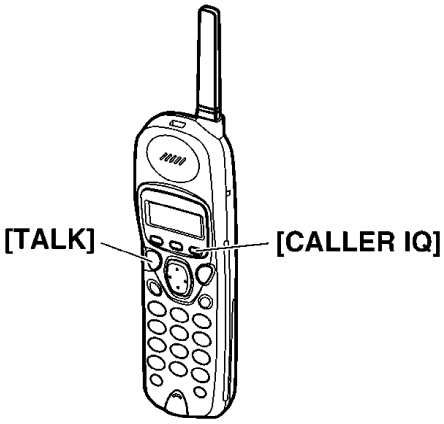
1. **Press [STOP].**
2. **Press [SET].**

10.4.1.3. By phone (call openLCR)

This method activates the Information Download, the Low Cost Routing feature and automatically sets the date and time.
Activating the Information Download by faxing openLCR will download a default setting. To customize your Information Download, go to the openLCR web site at www.openLCR.com.

- **A long distance bill may be sent to your from each of the low cost carriers used.**

Using the Handset



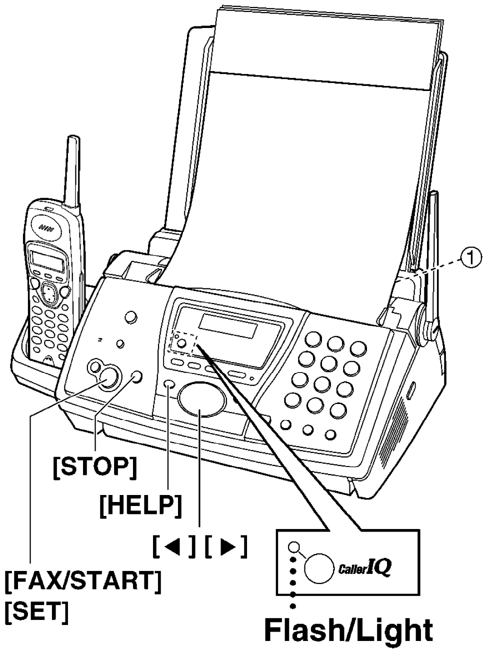
1. **Press [CALLER IQ].**
2. **Press [#].**
3. **Press [TALK].**
4. **Follow the voice prompt instructions.**

Note:

After downloading starts, the handset must be off-hook. DO NOT PLACE the handset on the base unit (placing the handset on the base unit will terminate the download process). DO NOT PRESS [OFF] (pressing [OFF] will terminate the download process).

To stop registration
Press [OFF].

Using the Base Unit



1. **Press [CALLER IQ].**
2. **Press [◄] or [►] repeatedly to display “CALL OPENLCR”.**
3. **Press [SET].**

   - Your fax machine will dial to openLCR automatically.
4. **Follow the voice prompt instructions.**
5. **Select your long distance carrier and calling plan by pressing the keys on the keypad as instructed by the voice prompt instructions.**
6. **Record your name, address and facsimile telephone number.**
7. **When finished, press [#].**

   - The CALLER IQ indicator will flash and your fax machine will

automatically receive the rate table.
- When the rate table download is completed, the CALLER IQ indicator will stop flashing but will remain lit up and the display will show “DOWNLOAD OK!”

To stop downloading

1. Press [STOP].

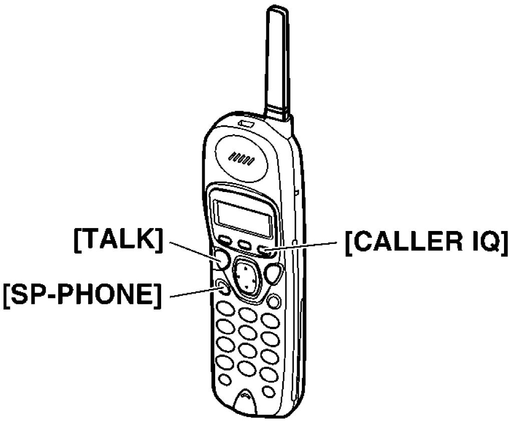
2. Press [SET].

10.4.2. Update

10.4.2.1. Upfating the Rate Table (downloading the rate table)

If you register through openLCR web site or move to another area, you have to download the rate table manually.

10.4.2.1.1. Using the Handset



1. Press [TALK] or [SP-PHONE], and then, press [CALLER IQ].

- If the display shows “Set Caller IQ to on.”, the Caller IQ feature is set to OFF. Set the Caller IQ feature to ON by referring to Operating Instructions.

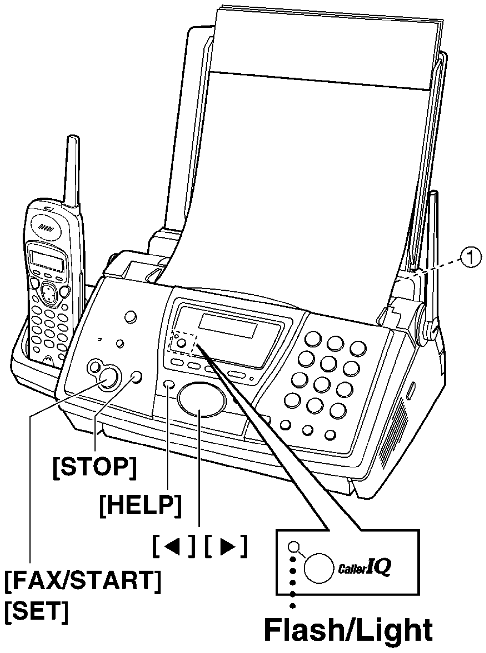
2. Press [#].

- The unit will dial to openLCR automatically.
- Follow the voice prompt to start downloading.

3. When downloading is complete, a beep sounds.

- **After downloading starts, the handset must be off-hook. DO NOT PLACE the handset on the base unit (placing the handset on the base unit will terminate the download process). DO NOT PRESS [OFF] (pressing [OFF] will terminate the download process).**
- **If the display shows "Download incomplete. Try again.", the unit was unable to download from openLCR.**
  Try down loading manually again.
- **If the display shows "Download incomplete. Directory full.", the unit was unable to download an item in the directory, because the directory memory is full.**
  Erase unnecessary items.

10.4.2.1.2. Using the Base Unit



1. **Press [CALLER IQ].**
2. **Press [#].**
3. **Press [SET].**
4. **Follow the voice prompt to start downloading.**

During download

- **The [CALLER IQ] indicator will flash and the display will show**

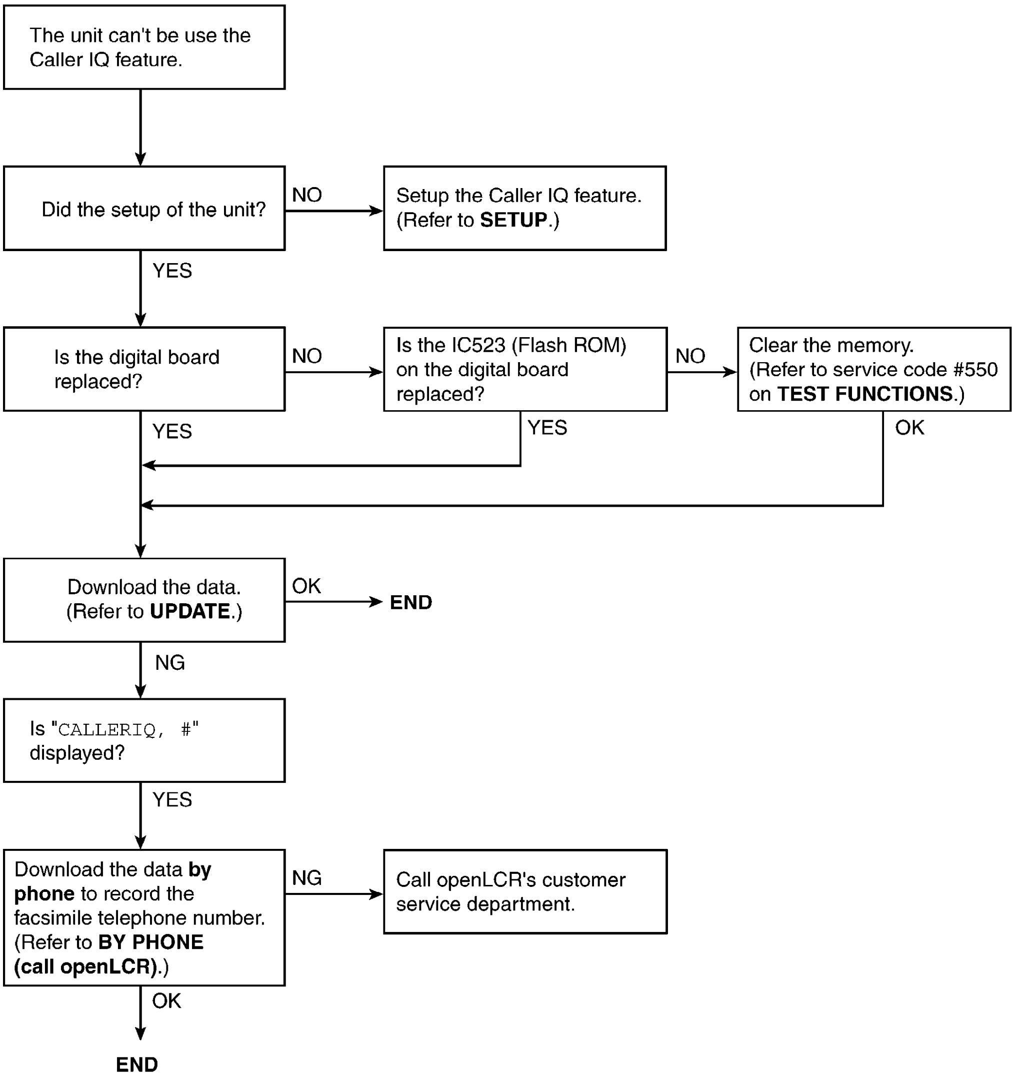
“DOWNLOADING“.

- **While downloading, you cannot do other operations such as making/answering calls or sending/receiving documents.**
- **Depending on where you live, the call for downloading may be a long distance call and will take about 1-2 minutes. You will be charged for the cost of the call.**
- **When the download is completed, the [CALLER IQ] indicator will stop flashing but will remain lit up and the display will show “DOWNLOAD OK!”**
- **If “DOWNLOAD ERROR. TRY AGAIN.“ is displayed, the unit was unable to download from openLCR.**
  Try downloading manually again.

Automatic download
The fax machine will automatically download the latest rate table when:
- the rate table in the fax machine reaches expiry date; usually between 60-90 days after last update,
- the fax machine is being polled by openLCR service center.

To stop downloading
1. Press [STOP].
2. Press [SET].

10.4.2.2. Troubleshooting


The unit can't be use the Caller IQ feature.
Did the setup of the unit?
NO
Setup the Caller IQ feature. (Refer to SETUP.)
YES
Is the digital board replaced?
NO
Is the IC523 (Flash ROM) on the digital board replaced?
NO
Clear the memory. (Refer to service code #550 on TEST FUNCTIONS.)
YES
YES
OK
Download the data. (Refer to UPDATE.)
OK
END
NG
Is "CALLERIQ, #" displayed?
YES
Download the data by phone to record the facsimile telephone number. (Refer to BY PHONE (call openLCR).)
NG
Call openLCR's customer service department.
OK
END

CROSS REFERENCE:

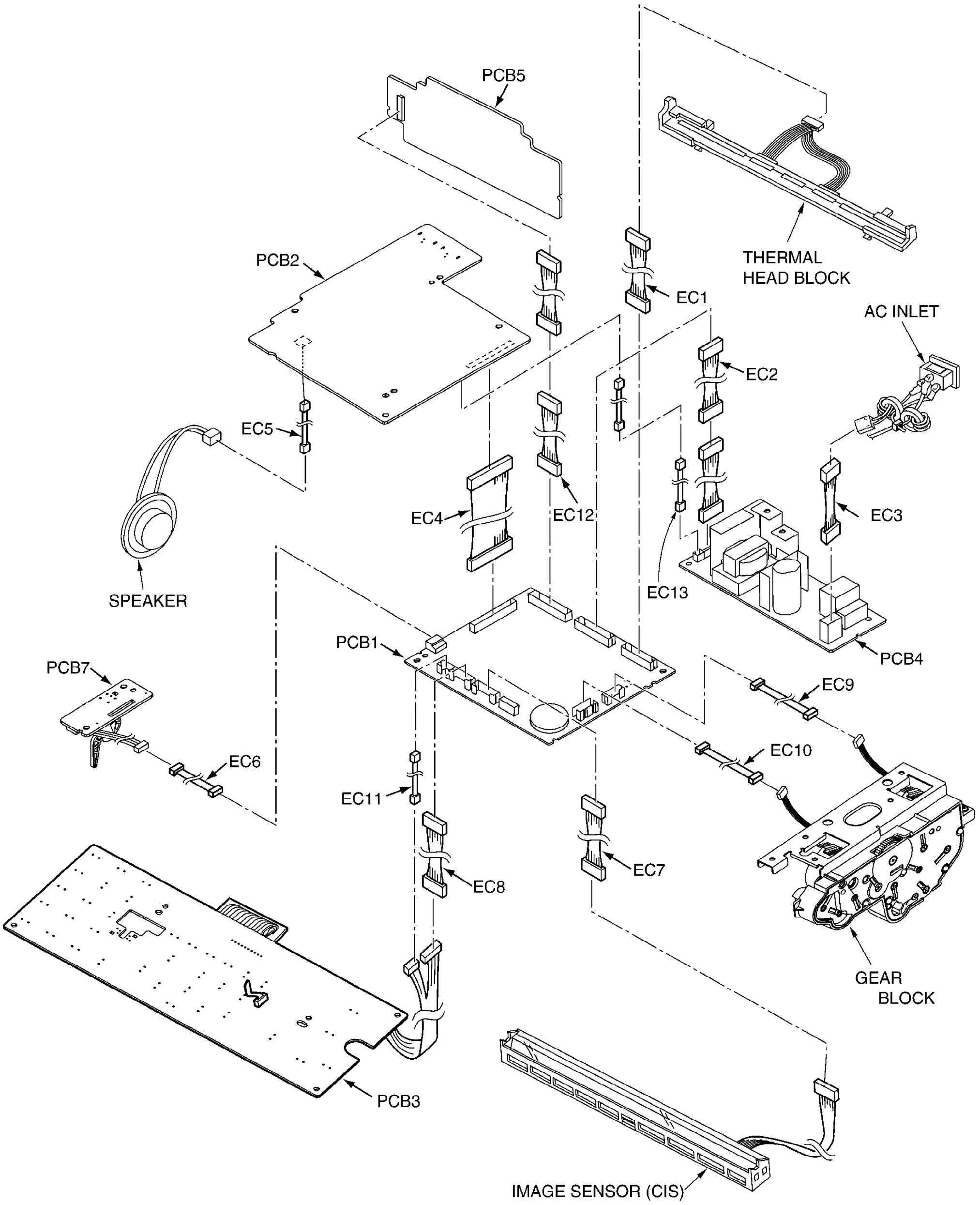
TEST FUNCTIONS ()

Setup ()

By phone (call openLCR) ()

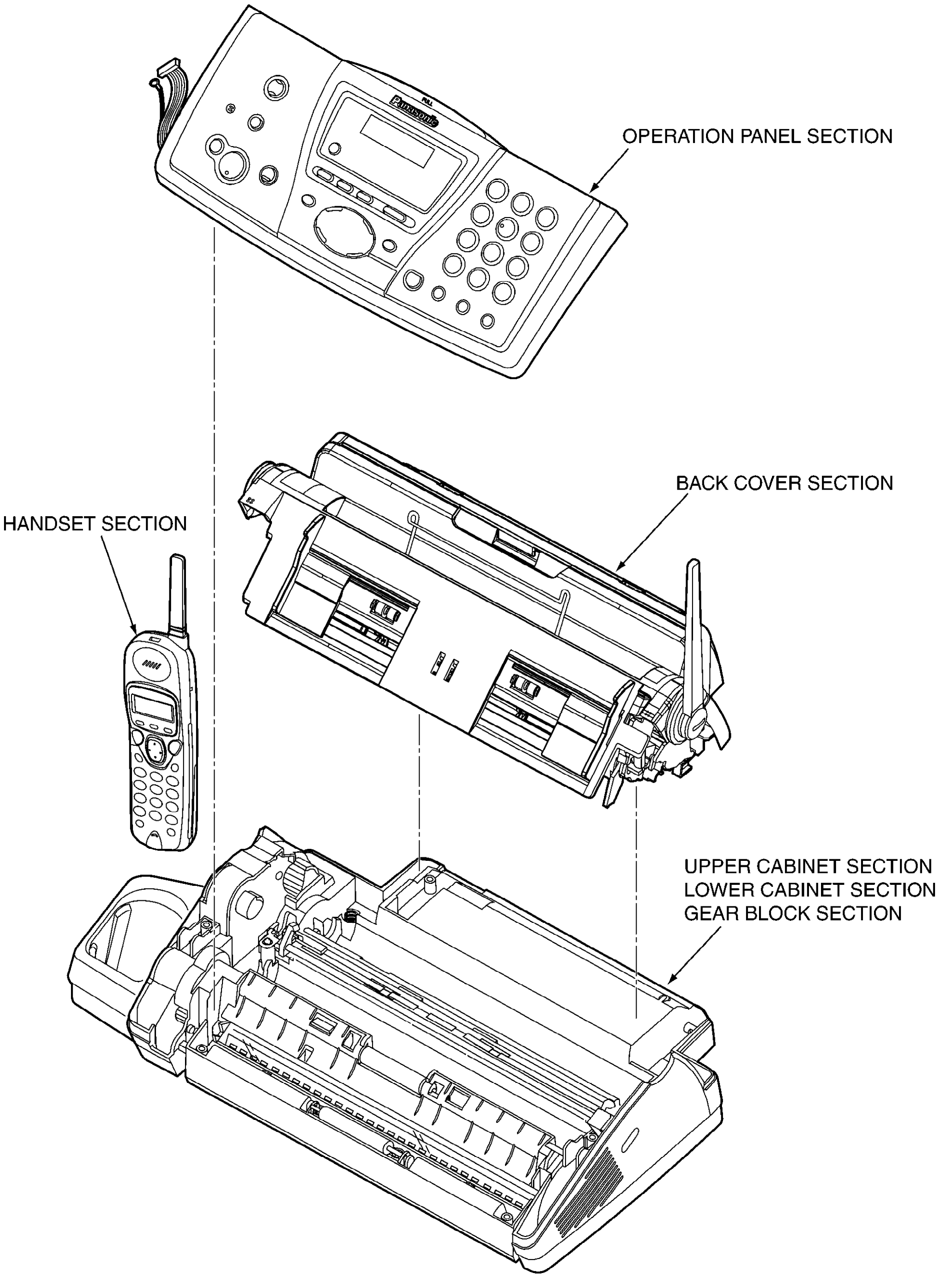
Update ()

11. FIXTURES AND TOOLS

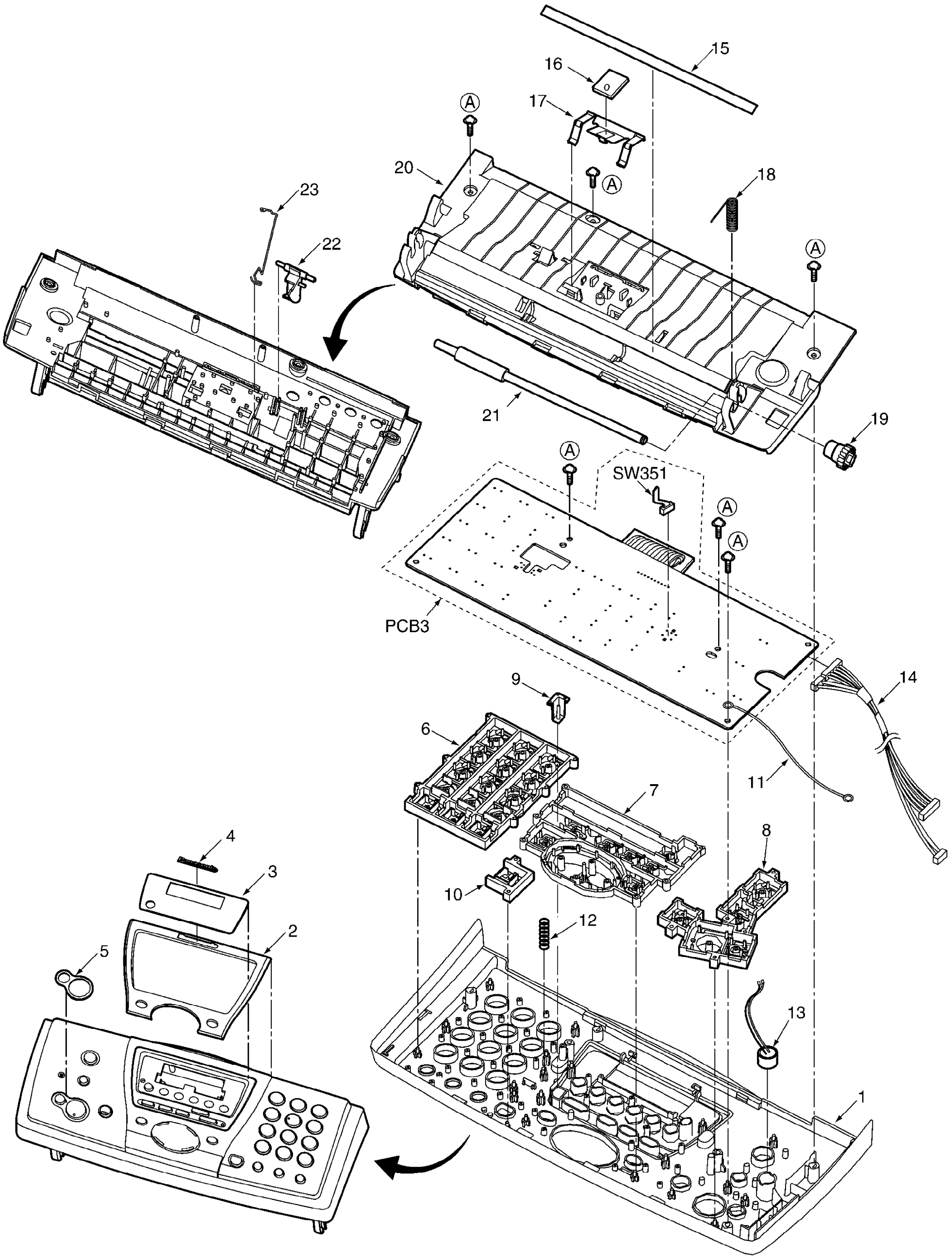

PCB5
THERMAL
HEAD BLOCK
PCB2
EC1
AC INLET
EC2
EC5
EC4
EC12
EC3
SPEAKER
EC13
PCB1
PCB4
PCB7
EC9
EC6
EC10
EC11
EC7
EC8
GEAR
BLOCK
PCB3
IMAGE SENSOR (CIS)

12. CABINET, MECHANICAL AND ELECTRICAL PARTS LOCATION

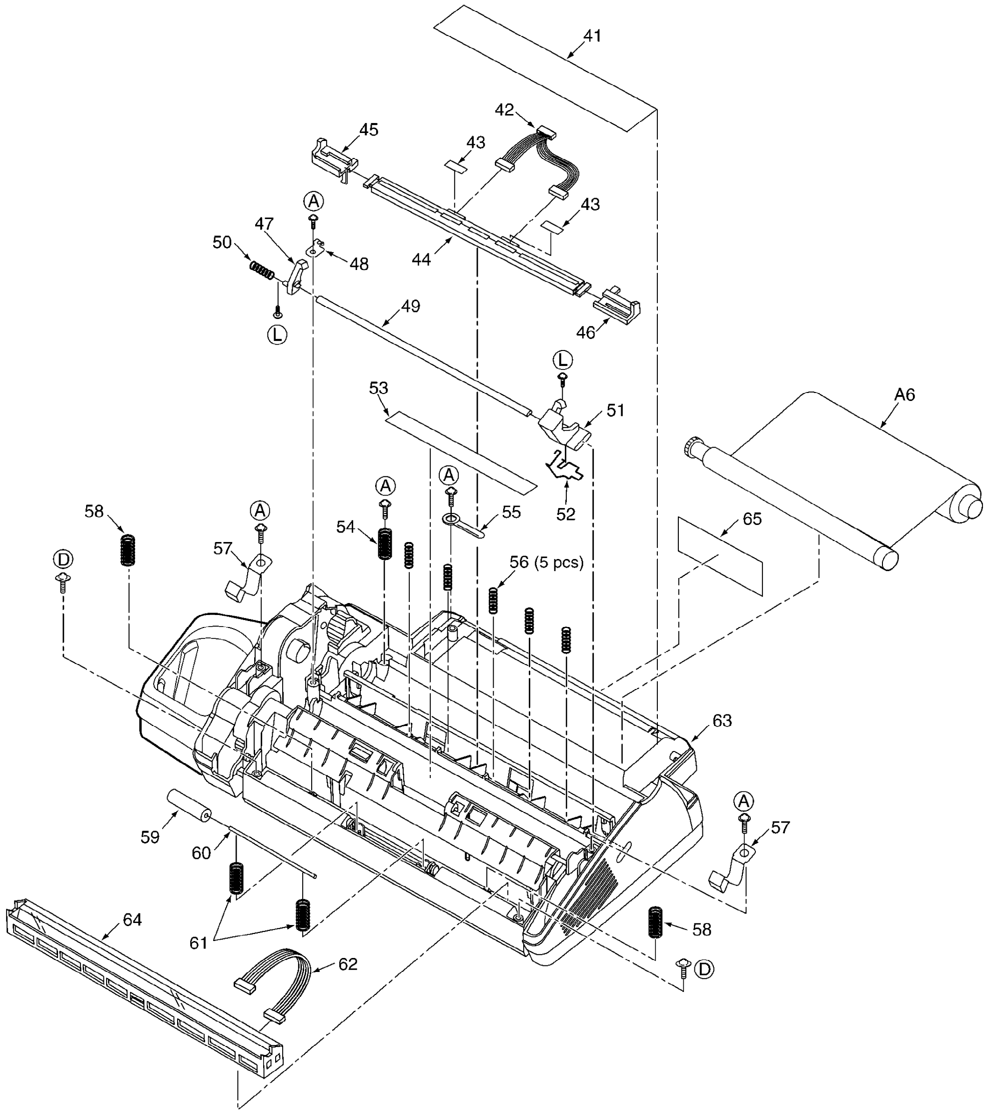
12.1. GENERAL SECTION


OPERATION PANEL SECTION
BACK COVER SECTION
HANDSET SECTION
UPPER CABINET SECTION
LOWER CABINET SECTION
GEAR BLOCK SECTION

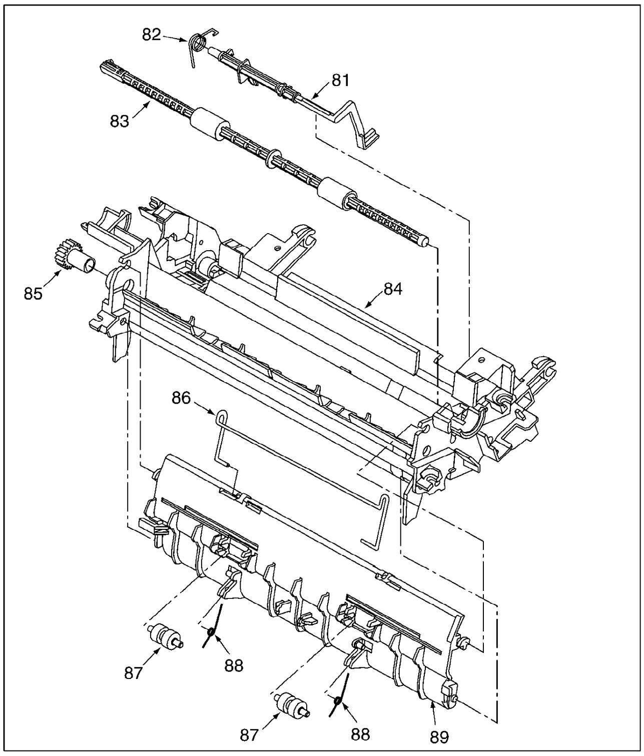
12.2. OPERATION PANEL SECTION

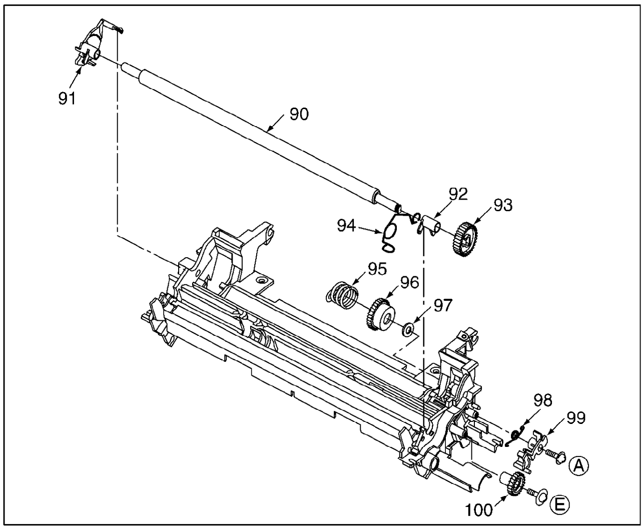

15
16
17
A
20
A
18
23
22
A
21
19
A
SW351
A
A
PCB3
14
9
6
11
7
4
8
3
10
12
2
5
13
1

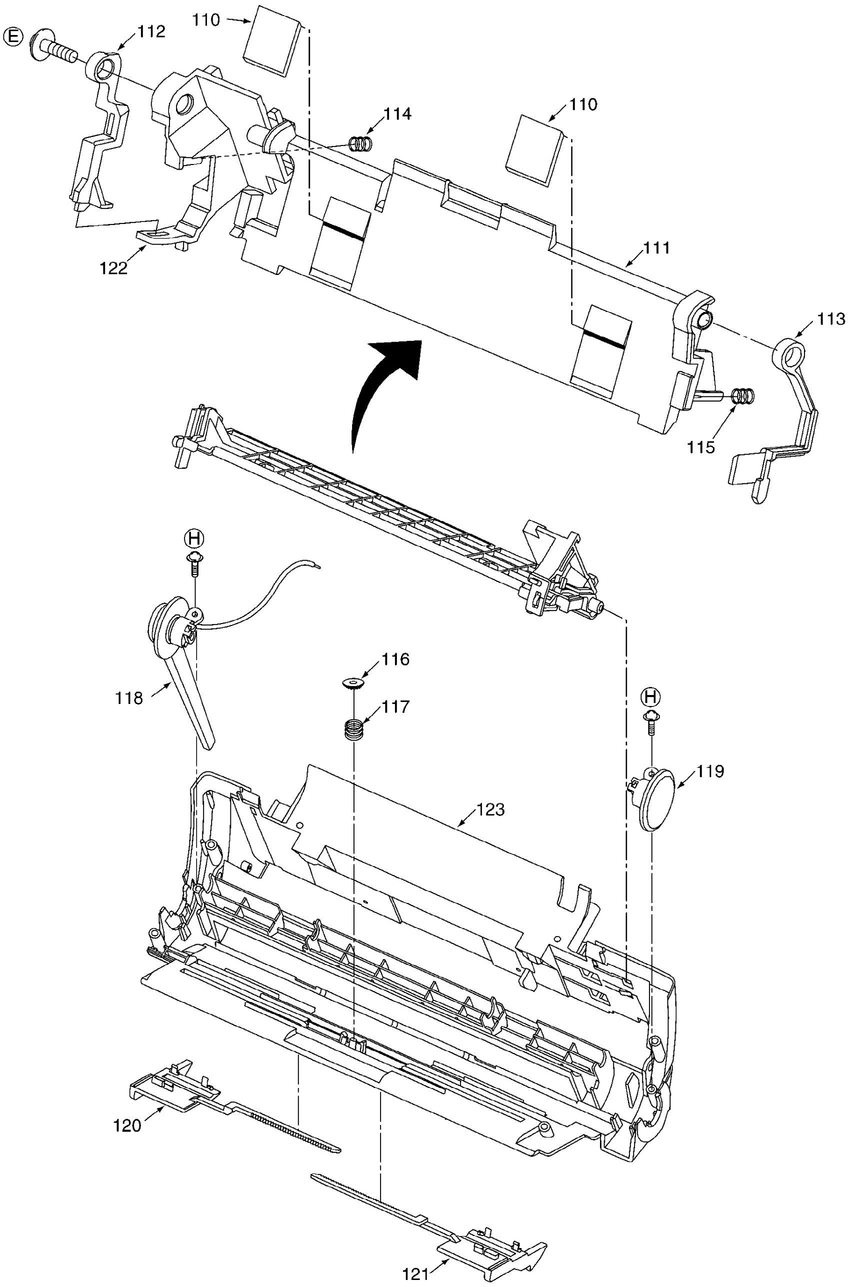
12.3. UPPER CABINET SECTION

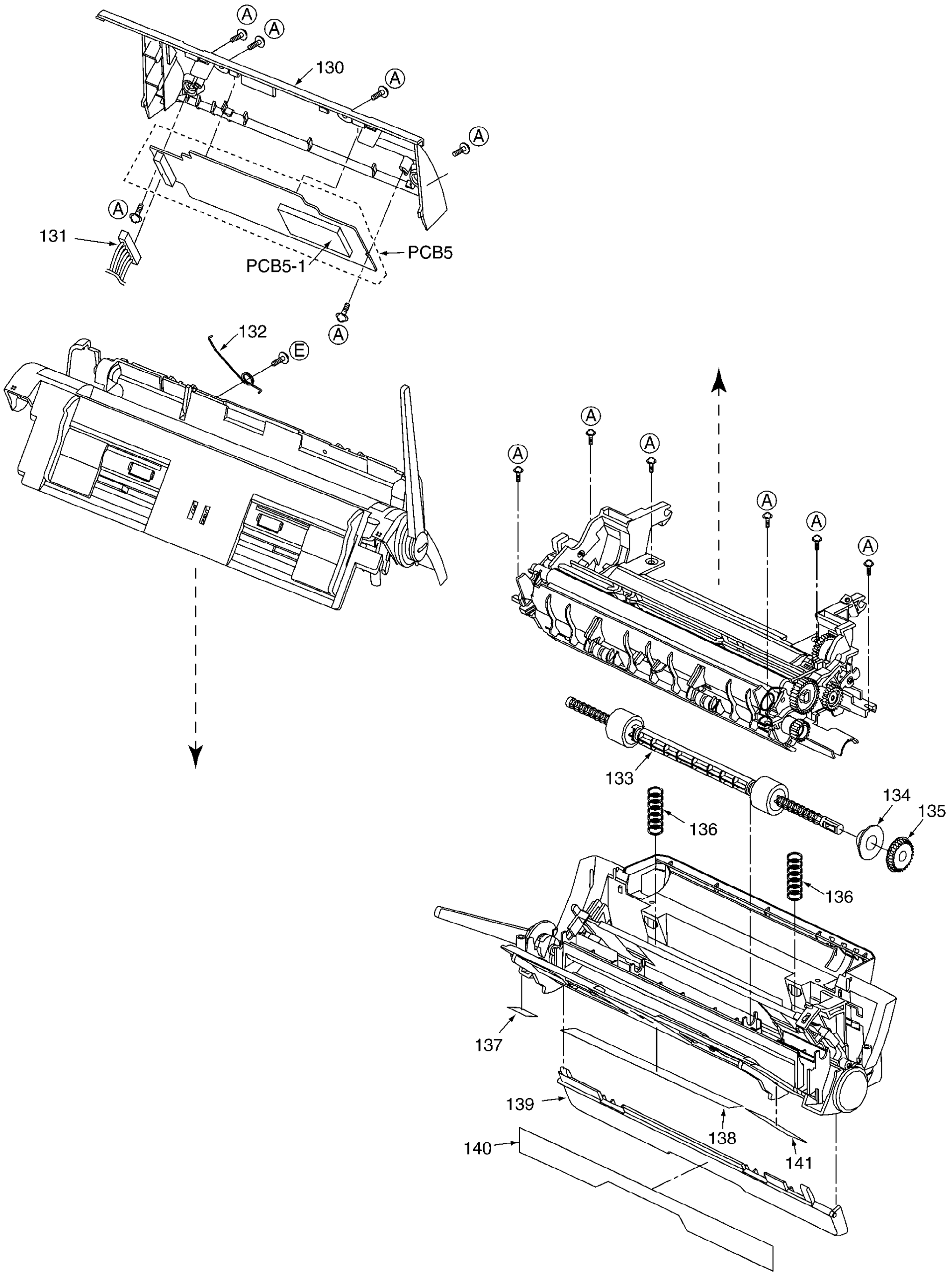

41
42
45
43
43
A
47
50
48
44
49
46
L
L
53
51
A6
52
A
A
55
58
A
54
56 (5 pcs)
65
D
57
63
A
57
59
60
58
64
61
62
D

12.4. BACK COVER SECTION

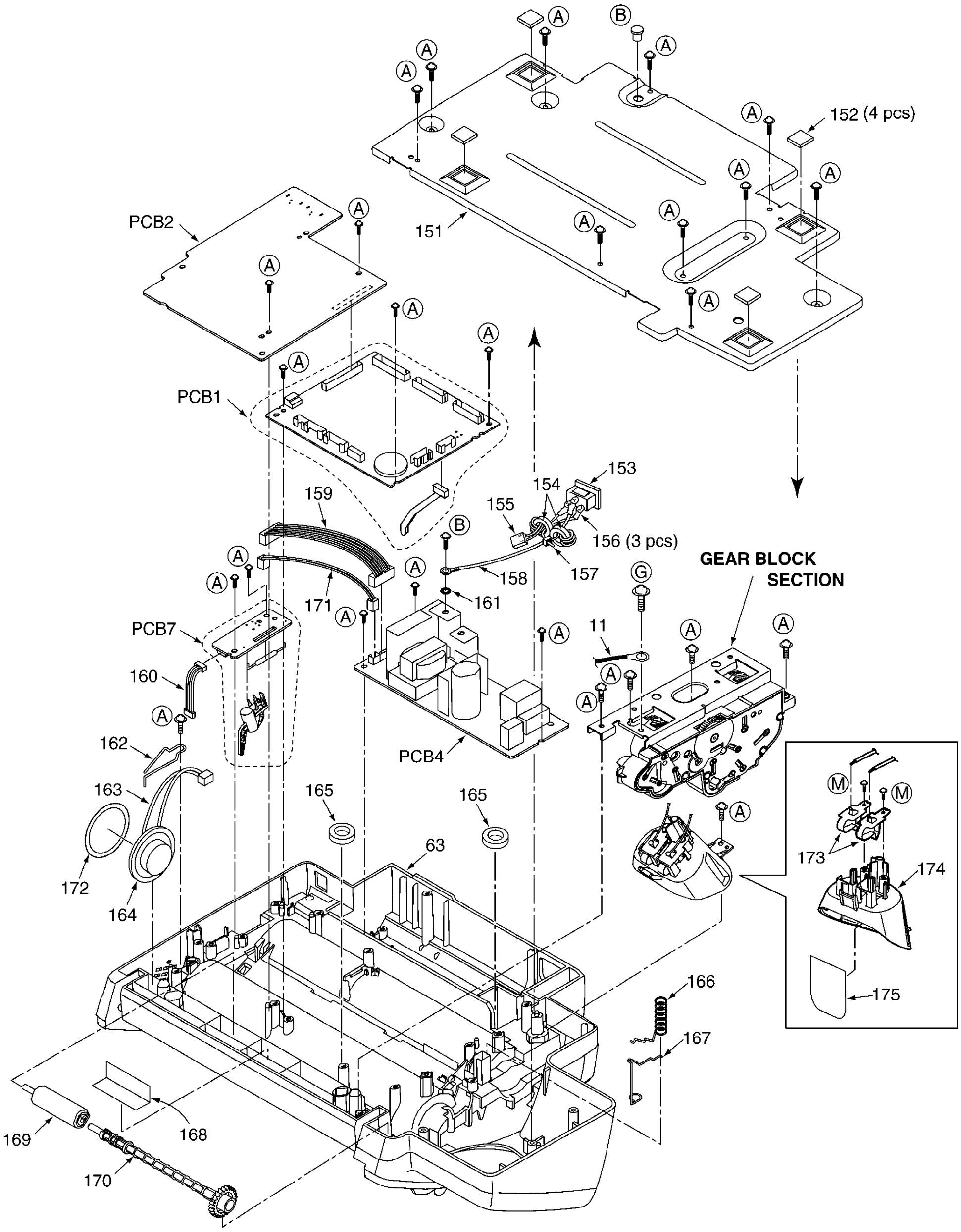



A
E


E
H
H


A
A
130
A
A
A
131
PCB5-1
PCB5
A
132
E
A
A
A
A
A
A
133
134
135
136
136
137
139
138
140
141

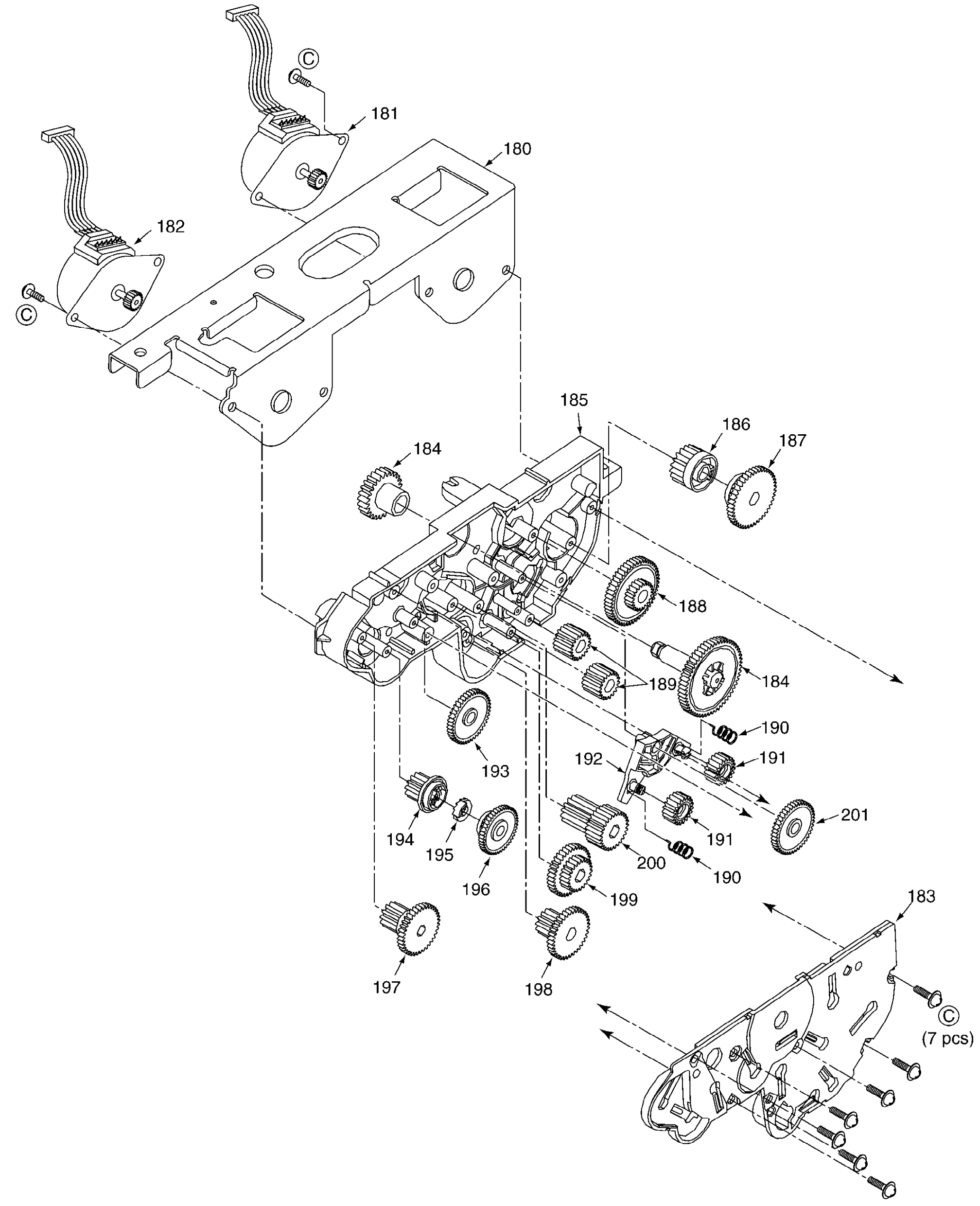
12.5. LOWER CABINET / P.C.BOARD SECTION


A
B
A
A
A
A
152 (4 pcs)
A
A
A
PCB2
A
A
151
A
A
A
A
PCB1
A
153
154
159
155
B
156 (3 pcs)
GEAR BLOCK SECTION
A
A
157
158
A
161
G
A
171
A
PCB7
A
11
A
A
A
160
A
162
PCB4
M
M
A
163
165
165
63
173
174
172
164
166
175
167
169
168
170

CROSS REFERENCE:

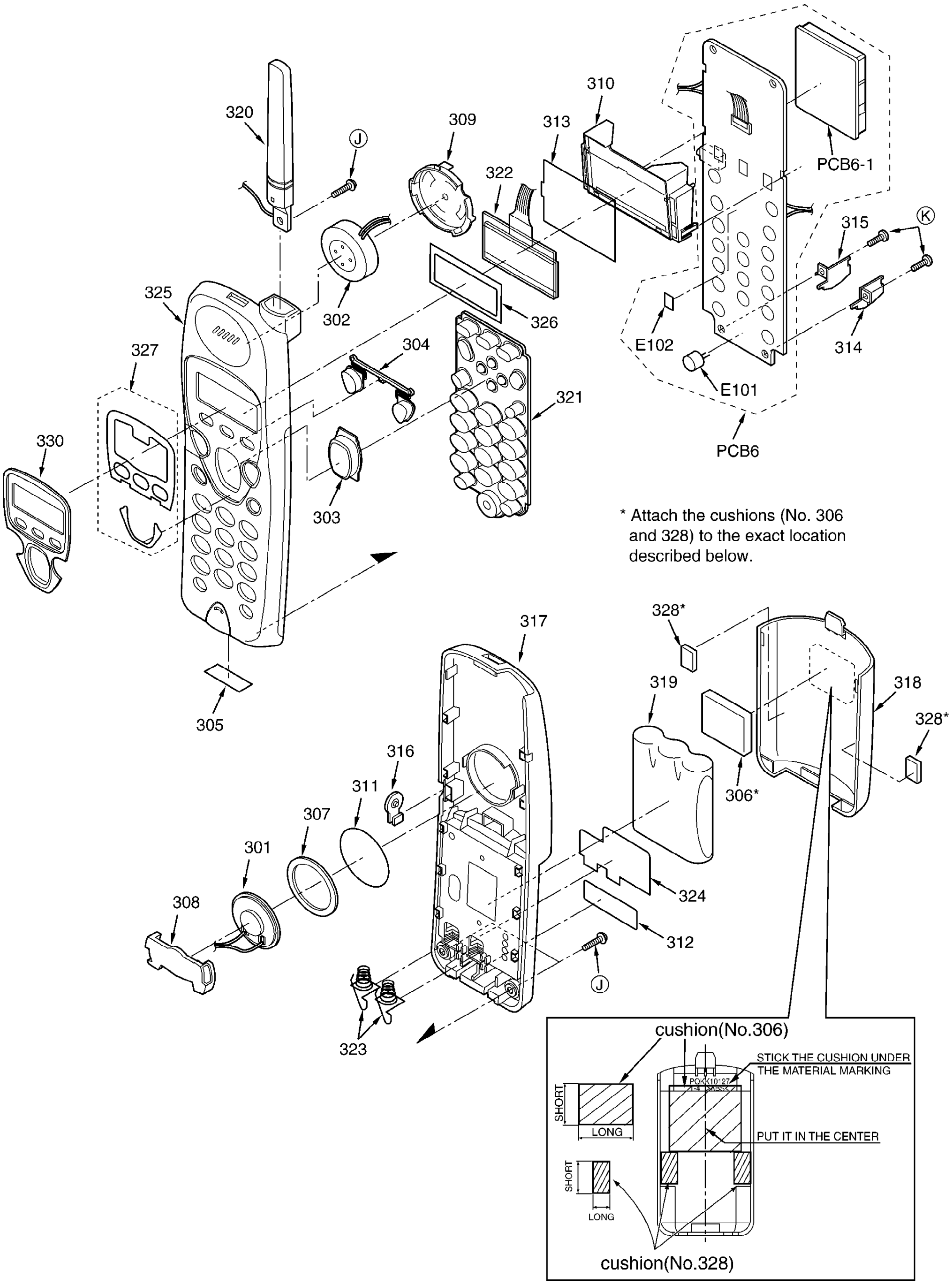
GEAR BLOCK SECTION ()

12.6. GEAR BLOCK SECTION



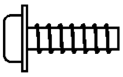
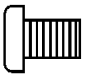
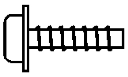
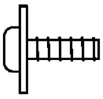
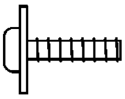
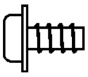
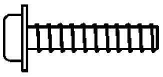
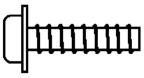
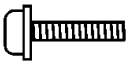
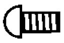
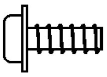
Ⓒ
181
180
182
Ⓒ
185
184
186
187
188
184
189
190
193
192
191
201
194
195
196
191
200
190
199
183
197
198
Ⓒ
(7 pcs)

12.7. HANDSET SECTION

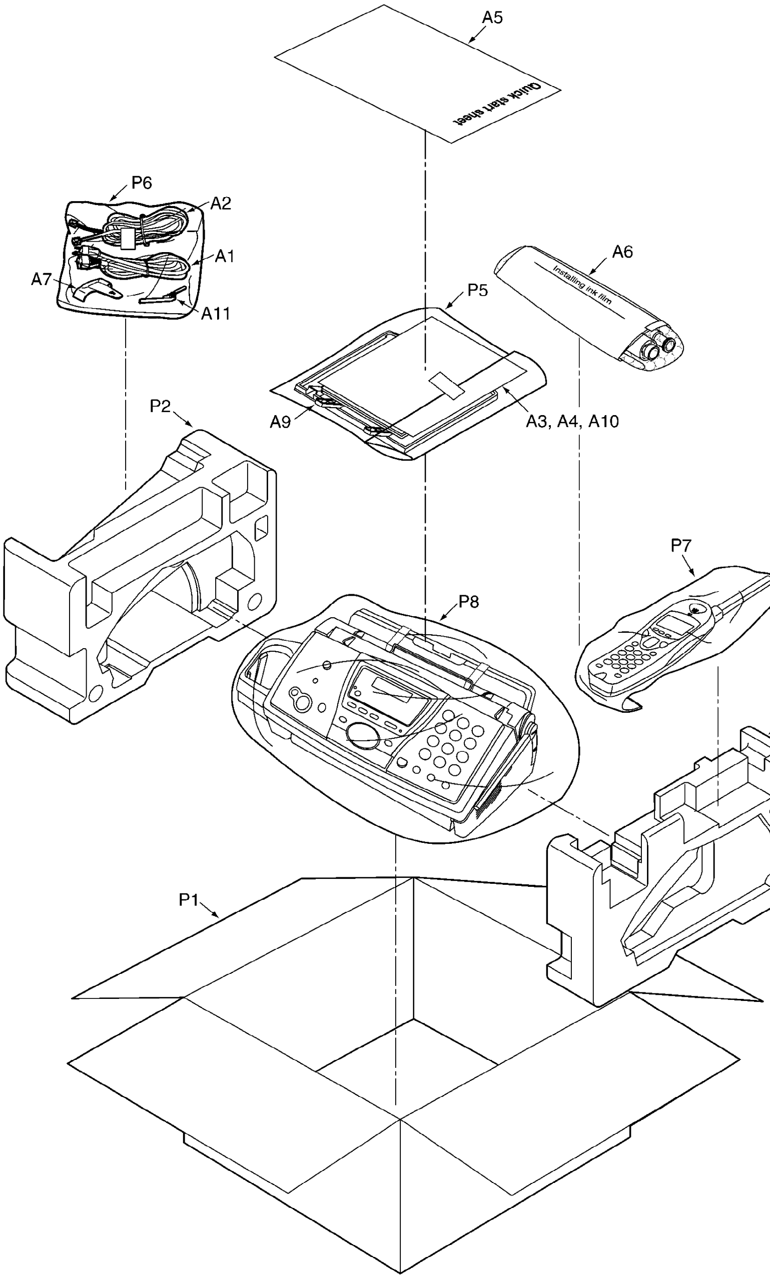

320
J
309
310
313
322
PCB6-1
315
K
325
302
326
327
304
E102
314
321
E101
330
PCB6
303
317
328*
319
318
328*
316
306*
311
307
301
324
308
312
J
323
cushion(No.306)
STICK THE CUSHION UNDER THE MATERIAL MARKING
SHORT
LONG
PUT IT IN THE CENTER
SHORT
LONG
cushion(No.328)

* Attach the cushions (No. 306 and 328) to the exact location described below.

12.8. SCREWS

	Part No.	Figure
Ⓐ	XTW3+S10P	 φ3 × 10 mm
Ⓑ	XSB4+6	 φ4 × 6 mm
Ⓒ	XTW26+10P	 φ2.6 × 10 mm
Ⓓ	XTW3+W8P	 φ3 × 8 mm
Ⓔ	XTW3+W10P	 φ3 × 10 mm
Ⓖ	XTW3+U6L	 φ3 × 6 mm
Ⓗ	XTW26+14P	 φ2.6 × 14 mm
Ⓙ	XTW26+12P	 φ2.6 × 12 mm
Ⓚ	XTB26+10J	 φ2.6 × 10 mm
Ⓛ	XQN2+A4FZ	 φ2 × 4 mm
Ⓜ	XTW26+8P	 φ2.6 × 8 mm

13. ACCESSORIES AND PACKING MATERIALS


A5
Quick start sheet
P6
A2
A1
A7
A11
A6
Installing ink film
P5
A9
A3, A4, A10
P2
P7
P8
P3
P1

14. REPLACEMENT PARTS LIST

1. RTL (Retention Time Limited)

Note:

The marking (RTL) indicates that the Retention Time is limited for this item.

After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of

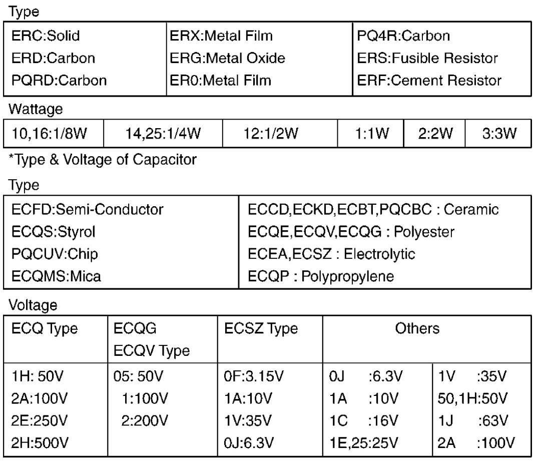
assembly, and in accordance with the laws governing parts and product retention.
After the end of this period, the assembly will no longer be available.

2. Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.

3. The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.

4. ISO code (Example: ABS-HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.

5. RESISTORS & CAPACITORS
Unless otherwise specified;
All resistors are in ohms (Ω) K=1000 Ω , M=1000k Ω
All capacitors are in MICRO FARADS (μ F) P= μ μ F
*Type & Wattage of Resistor



Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor	ECCD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V
2E:250V	2:200V	1V:35V	1C :16V	1J :63V
2H:500V		0J:6.3V	1E,25:25V	2A :100V

14.1. CABINET AND ELECTRICAL PARTS

14.1.1. Operation Panel Section

Ref. No.	Part No.	Part Name & Description	Remarks
1	PFGG1191Y1	GRILLE, OPERATION PANEL	PS+HBS
2	PFGG1192Y2	GRILLE, SUB (for KX-FPG376)	PS+HBS
2	PFGG1192X2	GRILLE, SUB (for KX-FPG377)	PS+HBS
3	PFGP1243Z	PANEL, LCD	
4	PQGB7X	BADGE	
5	PFHX1643Z	SPACER, RING SHEET	
6	PFBX1194Z1	PUSH BUTTON, DIAL	ABS+HBS
7	PFBX1195Y1	PUSH BUTTON, NAVIGATOR	ABS+HBS
8	PFBX1196Z1	PUSH BUTTON, START etc.	ABS+HBS
9	PFGE1011Z	COVER, LED	ABS+HB
10	PFBC1102Z1	PUSH BUTTON, SP-PHONE	ABS+HBS
11	BB17M3M3	LEAD WIRE, EARTH	S
12	PFUS1170Z	TORSION SPRING, DOC. LEVER	
13	PQJM128Z	BUILTIN-MICROPHONE	
14	PFJS10P78Z	CONNECTOR, 10 PIN	
15	PFHX1649Z	SPACER, READ SHEET	
16	PFHG1064Z	RUBBER PARTS, SEPARATION	
17	PFUS1454Z	LEAF SPRING, ADF	
18	PFUS1462Z	COIL SPRING, EARTH DOC.	
19	PFDG1335Z	GEAR, EXIT ROLLER	POM+HB
20	PFUV1066Y1	COVER, OPERATION PANEL	PS+HBS
21	PFDN1040Z	ROLLER, DOC. EXIT	
22	PFDE1213Z	LEVER, DOC. SENSOR	PS+HB
23	PFUS1507Z	TORSION SPRING, ADF EARTH	

14.1.2. Upper Cabinet Section

Ref. No.	Part No.	Part Name & Description	Remarks
41	PFQT2088Z	LABEL, INK FILM	
42	PFJS11P39Z	CONNECTOR, 11 PIN	
43	PFHX1350Z	SPACER, HEAD SHEET	
44	L1CB00000033	PRINTER UNITS, THERMAL HEAD	
45	PFHR1377Z	GUIDE, THERMAL HEAD HOLDER (LEFT)	POM+HB
46	PFHR1378Z	GUIDE, THERMAL HEAD HOLDER (RIGHT)	POM+HB
47	PFDE1211Z	LEVER, LOCK (LEFT)	POM+HB
48	PFMH1130Z	SPACER, LOCK PLATE (LEFT)	
49	PFDF1100Z	SHAFT, LOCK	
50	PFUS1483Z	COIL SPRING, LOCK	
51	PFDE1212Z1	LEVER, LOCK (RIGHT)	POM+HB S
52	PFUS1484Z	TORSION SPRING, EARTH LOCK	
53	PFQT2087Z	LABEL, BLUE GEAR	
54	PFUS1254Z	COIL SPRING, POP UP	
55	PQHM112Z	CLAMPER	S
56	PFUS1465Z	COIL SPRING, HEAD	
57	PFUS1453Z	LEAF SPRING, LOCK	
58	PFUS1463Z	COIL SPRING, CIS	
59	PFDR1045Z	ROLLER, DOC. SUB	POM+HB
60	PFDF1017Z	SHAFT	
61	PFUS1171Z	TORSION SPRING, ROLLER SPRING	
62	PFJS07P37Z	CONNECTOR, 7 PIN	
63	PFKM1125Z1	CABINET BODY, MAIN	PS+HB
64	N2GZBE000007	IMAGE SENSOR, CIS	
65	PFGT2258Z-M	NAME PLATE (for KX-FPG376)	
65	PFGT2303Z-M	NAME PLATE (for KX-FPG377)	

14.1.3. Back Cover Section-1

Ref. No.	Part No.	Part Name & Description	Remarks
81	PFDE1215Z	LEVER, PAPER TOP	POM+HB
82	PFUS1469Z	COIL SPRING, PAPER TOP	
83	PFDN1068Z	ROLLER, PAPER EXIT	POM+HB
84	PFUA1050Y	CHASSIS, U-TURN BASE	PS+HB
85	PFDG1340Z	GEAR, PAPER EXIT	POM+HB
86	PFUS1461Z	BAR SPRING, RECORDING PAPER SUPPORT	
87	PFDR1028Z	ROLLER, SUPPORT	POM+HB
88	PFUS1457Y	TORSION SPRING, PAPER EXIT	
89	PFUV1067Z	COVER, PAPER GUIDE	PS+HB
90	PFDN1069Z	ROLLER, PLATEN	
91	PFDJ1075Z	SPACER, PLATEN (RIGHT)	POM+HB
92	PFDJ1074Z	SPACER, PLATEN (LEFT)	POM+HB
93	PFDG1339Z	GEAR, PLATEN	POM+HB
94	PFUS1466Z	TORSION SPRING, EARTH PLATEN	
95	PFUS1470Z	COIL SPRING, BACK TENSION	
96	PFDG1341Z	GEAR, BACK TENSION	POM+HB
97	PFHS1029Z	COVER, BACK TENSION SHEET	
98	PFUS1460Z	TORSION SPRING, STOPPER	
99	PFDE1216Z	SPACER, STOPPER PLATE	POM+HB
100	PFDG1336Z	GEAR, PICKUP IDLER	POM+HB

14.1.4. Back Cover Section-2

Ref. No.	Part No.	Part Name & Description	Remarks
110	PFHG1088Z	RUBBER PARTS, PAPER SEPARATION	
111	PFKS1090Z	TRAY, CASSETTE PLATE	PS+HB
112	PFHR1379Z	ARM, CORNER FLAP (LEFT)	POM+HB
113	PFHR1380Z	ARM, CORNER FLAP (RIGHT)	POM+HB
114	PFUS1458Z	COIL SPRING, CORNER FLAP	
115	PFUS1468Z	COIL SPRING, CORNER FLAP	
116	PFDG1015X	SPACER, SLIDER GEAR	POM+HB
117	PFUS1317Z	COIL SPRING, SLIDER	
118	PQSA10109P	ANTENNA	
119	PFKE1034Z1	COVER, ANTENNA CAP	
120	PFKR1032Z1	GUIDE, DOCUMENT (RIGHT)	ABS+HBS
121	PFKR1031Z1	GUIDE, DOCUMENT (LEFT)	ABS+HBS
122	PFHR1381Z	GUIDE, FLAP HOLDER (LEFT)	POM+HB
123	PFKV1076Y1	COVER, U-TURN	PS+HBS

14.1.5. Back Cover Section-3

Ref. No.	Part No.	Part Name & Description	Remarks
130	PFKV1077Z1	COVER, RF UNIT	PS+HBS
131	PFJS13P45Z	CONNECTOR, 13 PIN	
132	PFUS1459Z	TORSION SPRING, HOLDER CORNER	
133	PFDN1067Z	ROLLER, PICKUP	POM+HB
134	PFDE1217Z	SPACER, PICKUP GEAR	POM+HB
135	PFDG1338Z	GEAR, PICKUP DELAY	POM+HB
136	PFUS1414Z	TORSION SPRING, PICKUP	
137	PFQT2080Z	LABEL, OPEN	
138	PFQT2079Z	LABEL, SENDING	
139	PFDE1214Z1	LEVER, CASSETTE	PS+HBS
140	PFQT2078Z	LABEL, PAPER SET	
141	PFQT2151Z	LABEL, LOCK	

14.1.6. Lower Cabinet Section

Ref. No.	Part No.	Part Name & Description	Remarks
151	PFMD1071Z	FRAME, BOTTOM	
152	PFHG1050Z	RUBBER PARTS, LEG	
153	PFJP03S04Z	SOCKET, AC INLET	⚠
154	PQLB1E1	INSULATOR, FERRITE CORE	
155	PQJS02Q59W	CONNECTOR, 2 PIN	
156	PQMX10010Z	COVER, TUBE	
157	PQHR945Z	BAND	
158	WLR18YK26CM4	LEAD WIRE	
159	PFJS07P40Z	CONNECTOR, 7 PIN	
160	PFJS03P45Z	CONNECTOR, 3 PIN	
161	XWC4B	WASHER	
162	PFUS1467Z	TORSION SPRING, SPEAKER	
163	PFJS02P76Z	CONNECTOR, 2 PIN	
164	PFAS50P006Z	SPEAKER	
165	PQLB1E1	INSULATOR, FERRITE CORE	
166	PFUS1485Z	COIL SPRING, EARTH HEAD	
167	PFUS1464Z	TORSION SPRING, EARTH SHAFT	
168	PFHX1670Z	SPACER, ROLLER SHEET	
169	PFDR1014Z	ROLLER, DOC. SEPARATION	POM+HB
170	PFDF1099Z	SHAFT, DOC. SEPARATION	POM+HB
171	PFJS03P72Z	CONNECTOR, 3 PIN	
172	PFHG1024Z	SPACER, SPEAKER	
173	PFJT1020Z	TERMINAL, CHARGE	
174	PFKE1033Z2	CASE, CHARGE	
175	PFQT2150Z	LABEL, CHARGE	

14.1.7. Gear Block Section

Ref. No.	Part No.	Part Name & Description	Remarks
180	PFMH1129Z	ANGLE, GEAR BASE PLATE	
181	35S1S15DGNE	STEPPING MOTOR	
182	35S1S15DGNJ	STEPPING MOTOR	
183	PFHR1375V	FRAME, COVER GEAR CHASSIS	POM+HB
184	PFDX1038Z	GEAR, TORQUE LIMITER	POM+HB
185	PFUA1049Y	CHASSIS, GEAR	PBT+ABS
186	PFDG1329Z	GEAR, PICKUP	POM+HB
187	PFDG1328Z	GEAR, PICKUP	POM+HB
188	PFDG1332Z	GEAR, PLATEN	POM+HB
189	PFDG1326Z	GEAR, EXIT IDLER	POM+HB
190	PFUS1231Y	COIL SPRING, GEAR	
191	PFDG1333Z	GEAR, ARM IDLER	POM+HB
192	PFHR1376Z	ARM, GEAR	POM+HB
193	PFDG1325Z	GEAR, DOC. IDLER	POM+HB
194	PFDG1324Z	GEAR, DOC. DRIVEN	POM+HB
195	PFDE1210Z	SPACER, RATCH	POM+HB
196	PFDG1323Z	GEAR, DOC. DRIVEN	POM+HB
197	PFDG1322Z	GEAR, DOC.	POM+HB
198	PFDG1327Z	GEAR, EXIT IDLER	POM+HB
199	PFDG1330Z	GEAR, PLATEN	POM+HB
200	PFDG1331Z	GEAR, PLATEN	POM+HB
201	PFDG1334Z	GEAR, ARM SUN	POM+HB

14.1.8. Handset Section

Ref. No.	Part No.	Part Name & Description	Remarks
301	PQAS3P07Y	SPEAKER	
302	PQAX3P27Z	RECEIVER	
303	PQBC10356Z1	NAVIGATION BUTTON	S
304	PQBX10356Z1	TALK, OFF BUTTON	S
305	PFGT2259Z-M	NAME PLATE	
306	PQHE10121Z	CUSHION, URETHANE FORM	
307	PQHG10589Y	SP RUBBER SHEET	
308	PQHR10778Z	SP HOLDER	ABS-HB
309	PQHR10855Z	SP HOLDER	ABS-HB
310	PQHR10912Z	LCD HOLDER	ABS-HB
311	PQHS10457Z	SPEAKER NET	
312	PQQT22419Z	PRODUCTION LABEL	
313	PQHX11005Z	LCD SHEET	
314	PQJT10176Z	CHARGE TERMINAL (L)	
315	PQJT10177Z	CHARGE TERMINAL (R)	
316	PQKE10342Z1	HEADSET JACK COVER	S
317	PQKF10558X1	REAR CABINET	S
318	PQKK10127Z1	BATTERY COVER	S
319	P-P511	BATTERY	S
320	PQSA10125Z	ANTENNA	
321	PQSX10208Z	RUBBER SWITCH	
322	PQADGP332GN2	LIQUID CRYSTAL DISPLAY	
323	PQJC10050Y	BATTERY TERMINAL	
324	PQQT22418Z	BATTERY LABEL	
325	PQKM10551G1	FRONT CABINET	ABS-HB
326	PQHS10470Z	CUSHION, LCD	
327	PQHS10535Z	DOUBLE SIDE TAPE, GRILL	
328	PQHS10505Z	CUSHION, URETHANE FORM	
329	Not Used		
330	PQGP10201Z1	LCD PANEL	ABS-HB

14.1.9. Accessories and Packing Materials

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PFJA1030Z	POWER CORD	⚠
A2	PQJA10075Z	CORD, TELEPHONE	
A3	PFQX1859Z	INSTRUCTION BOOK (for openLCR)	
A4	PFQX1858Y	INSTRUCTION BOOK	
A5	PFQW1981Y	INSTRUCTION BOOK, QUICK START SHEET	
A6	PFPE1251Z	INK RIBBON [10 m] (for KX-FPG376)	
A6	PFPE1462Z	INK RIBBON [35 m] (for KX-FPG377)	
A7	PQKE10341Z1	HANGER, BELT CLIP	S
A8	Not Used		
A9	PFKS1088Z1	TRAY, RECORDING PAPER	PS+HB S
A10	PFQW2039Y	INSTRUCTION BOOK, QUICK REFERENCE GUIDE	
A11	PFKS1089Z1	GUIDE, A4 SPACER	PS+HB S
P1	PFPE1463Y-M	GIFT BOX ASS'Y (for KX-FPG376)	S
P1	PFZE1161Z-M	GIFT BOX ASS'Y (for KX-FPG377)	S
P2	PFPN1317Y	CUSHION, LEFT	
P3	PFPN1318Y	CUSHION, RIGHT	
P4	Not Used		
P5	XZB32X45A04	PROTECTION COVER	
P6	XZB20X35A04	PROTECTION COVER	
P7	XZB10X35A02	PROTECTION COVER	
P8	PFPH1029Z	PACKING SHEET	

14.2. DIGITAL BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PFWP1FPG376M	DIGITAL BOARD ASS'Y (RTL)	
		(ICs)	
IC501	C1ZBZ0001896	IC	
IC502	PFWIFPG376M	IC (ROM)	
IC503	C3ABKC000027	IC	
IC505	PFVIR675813	IC	
IC507	PFVII5510011	IC	
IC508	PFVIT2003APS	IC	S
IC509	PFVIT2003APS	IC	S
IC518	C3FAKC000008	IC	
IC520	PQVITC4066BF	IC	S
IC521	PQVINJM4558M	IC	S
IC522	PQVITC4066BF	IC	S
IC523	C1ZBZ0002029	IC	
		(TRANSISTORS)	
Q501	PQVTDTC143E	TRANSISTOR(SI)	S
Q502	2SB1322	TRANSISTOR(SI)	S
Q503	PQVTDTC143E	TRANSISTOR(SI)	S
Q504	PQVTDTC143E	TRANSISTOR(SI)	S

Ref. No.	Part No.	Part Name & Description	Remarks
Q505	**2SD1819A**	**TRANSISTOR(SI)**	**S**
Q506	**2SD1819A**	**TRANSISTOR(SI)**	**S**
Q507	**2SD1819A**	**TRANSISTOR(SI)**	**S**
Q508	**2SB1322**	**TRANSISTOR(SI)**	**S**
Q520	**2SB1197KQ**	**TRANSISTOR(SI)**	**S**
Q524	**PQVTDTC143E**	**TRANSISTOR(SI)**	**S**
Q525	**PQVTDTC143E**	**TRANSISTOR(SI)**	**S**
Q526	**2SD1819A**	**TRANSISTOR(SI)**	**S**
Q529	**2SD1819A**	**TRANSISTOR(SI)**	**S**
IC506	**PFVTSI4431DY**	**TRANSISTOR(SI)**	**S**
		(DIODES)	
D501	**PFVDRMRLS245**	**DIODE(SI)**	**S**
D502	**MA7160**	**DIODE(SI)**	**S**
D503	**PFVDRMRLS245**	**DIODE(SI)**	**S**
D504	**PFVDRMRLS245**	**DIODE(SI)**	**S**
D505	**MA7160**	**DIODE(SI)**	**S**
		(BATTERY)	
BAT501	**PFSU1004Z**	**LITIUM BATTERY**	
		(CONNECTORS)	
CN501	**PQJP17A19Z**	**CONNECTOR, 17 PIN**	**S**
CN502	**PQJP5G30Z**	**CONNECTOR, 5 PIN**	**S**
CN503	**PQJP7G30Z**	**CONNECTOR, 7 PIN**	**S**
CN504	**PQJP8G30Z**	**CONNECTOR, 8 PIN**	**S**
CN505	**PQJP11G30Z**	**CONNECTOR, 11 PIN**	**S**
CN506	**PQJP7G30Z**	**CONNECTOR, 7 PIN**	**S**
CN508	**K1MN08A00017**	**CONNECTOR, 8 PIN**	
CN509	**PQJP3G30Z**	**CONNECTOR, 3 PIN**	**S**
CN510	**PQJP13G30Z**	**CONNECTOR, 13 PIN**	**S**
CN512	**PQJP05G100Z**	**CONNECTOR, 5 PIN**	
CN513	**PQJP3G43Z**	**CONNECTOR, 3 PIN**	**S**
		(SWITCH)	
SW501	**PFSH1A001Z**	**SWITCH, FILM END/COVER OPEN**	
		(COILS)	
L506	**J0JCC0000042**	**COIL**	
L510	**PQLQR2KA20T**	**COIL**	**S**
L512	**PQLQR2KA20T**	**COIL**	**S**
L514	**J0JCC0000042**	**COIL**	
L515	**PQLQR2KA20T**	**COIL**	**S**
L519	**PQLQR2KA113**	**COIL**	**S**
L520	**PQLQR2KA20T**	**COIL**	**S**
		(COMPONENTS PARTS)	
RA501	**EXB38V101JV**	**RESISTOR ARRAY**	
RA502	**EXB38V101JV**	**RESISTOR ARRAY**	
RA503	**EXB38V101JV**	**RESISTOR ARRAY**	
RA504	**EXB38V101JV**	**RESISTOR ARRAY**	
RA505	**EXB38V101JV**	**RESISTOR ARRAY**	
RA506	**EXB38V101JV**	**RESISTOR ARRAY**	

Ref. No.	Part No.	Part Name & Description	Remarks
RA509	EXB38V101JV	RESISTOR ARRAY	
RA510	EXB38V101JV	RESISTOR ARRAY	
RA511	EXB38V101JV	RESISTOR ARRAY	
RA512	EXB38V103JV	RESISTOR ARRAY	
		(CRYSTAL OSCILLATORS)	
X501	PFVCCFS32Z	CRYSTAL OSCILLATOR	S
X502	H0H245500015	CRYSTAL OSCILLATOR	
X503	PFVC32256ZAT	CRYSTAL OSCILLATOR	S
		(FUSES)	
F501	PFRB0031125T	FUSE	S
F502	PFRB0031125T	FUSE	S
F504	PFRB0031025T	FUSE	
F505	PFRB0031025T	FUSE	
		(RESISTORS)	
C573	ERJ3GEY0R00	0	
C708	ERJ3GEY0R00	0	
F503	ERJ3GEY0R00	0	
L516	ERJ3GEYJ101	100	
L517	ERJ3GEYJ101	100	
L518	PQ4R18XJ220	22	S
R501	ERJ3GEYJ562	5.6k	
R502	ERJ3GEYJ472	4.7k	
R503	ERJ3GEYJ101	100	
R504	ERJ3GEYJ101	100	
R505	ERJ3GEYJ101	100	
R506	ERJ3GEYJ101	100	
R507	ERJ3GEYJ101	100	
R508	ERJ3GEYJ102	1k	
R509	ERJ3GEY0R00	0	
R510	ERJ3GEYJ101	100	
R511	ERJ3GEY0R00	0	
R512	ERJ3GEYJ821	820	
R513	ERDS1VJ152	1.5k	S
R514	ERJ3GEYJ821	820	
R516	ERDS1VJ152	1.5k	S
R517	ERJ3GEYJ472	4.7k	
R522	ERJ3GEYJ223	22k	
R523	ERJ3GEYJ433	43k	
R524	ERJ3GEYJ101	100	
R525	ERJ3GEYJ472	4.7k	
R526	ERJ3EKF1101	1.1k	
R527	ERJ3GEY0R00	0	
R528	ERJ3GEYJ472	4.7k	
R529	ERJ3EKF3602	36k	
R530	ERJ3GEYJ101	100	
R531	ERJ3GEYJ334	330k	
R532	ERJ3GEYJ475	4.7M	
R533	ERJ3GEYJ203	20k	
R534	ERJ3GEYJ472	4.7k	
R535	ERJ3GEYJ472	4.7k	

Ref. No.	Part No.	Part Name & Description	Remarks
R544	ERJ3GEYJ222	2.2k	
R545	ERJ3GEYJ471	470	
R548	ERJ3GEYJ103	10k	
R549	ERJ3GEYJ101	100	
R550	ERJ3GEYJ103	10k	
R551	ERJ3GEYJ101	100	
R552	ERJ3GEYJ151	150	
R553	ERJ3GEYJ105	1M	
R556	ERJ3GEY0R00	0	
R557	ERJ3GEYJ101	100	
R558	ERJ3GEYJ272	2.7k	
R561	ERJ3GEYJ472	4.7k	
R563	ERJ3GEYJ561	560	
R565	ERJ3GEYJ222	2.2k	
R567	ERJ3GEYJ102	1k	
R576	ERJ3GEYJ103	10k	
R577	ERJ3GEYJ102	1k	
R578	ERJ3GEYJ222	2.2k	
R579	ERJ3GEYJ102	1k	
R600	ERG2SJ681	680	
R601	ERJ3GEYJ103	10k	
R603	ERG2SJ391	390	
R619	ERJ3GEYJ333	33k	
R620	PQ4R18XJ000	0	S
R621	ERJ3GEYJ4R7	4.7	
R625	ERJ3GEYJ101	100	
R626	ERJ3GEYJ101	100	
R629	ERJ3GEYJ101	100	
R630	ERJ3GEYJ101	100	
R634	ERJ3GEYJ101	100	
R635	ERJ3GEYJ103	10k	
R681	ERJ3GEYJ472	4.7k	
R682	ERJ3GEYJ104	100k	
R683	ERJ3GEYJ103	10k	
R684	ERJ3GEYJ153	15k	
R685	ERJ3GEYJ682	6.8k	
R686	ERJ3GEYJ153	15k	
R687	ERJ3GEYJ473	47k	
R688	ERJ3GEYJ273	27k	
R689	ERJ3GEYJ184	180k	
R690	ERJ3GEYJ394	390k	
R691	ERJ3GEYJ274	270k	
R692	ERJ3GEYJ334	330k	
R693	ERJ3GEYJ472	4.7k	
R694	ERJ3GEYJ822	8.2k	
R695	ERJ3GEYJ224	220k	
R696	ERJ3GEYJ474	470k	
R697	ERJ3GEYJ222	2.2k	
R698	ERJ3GEYJ122	1.2k	
R699	ERJ3GEYJ103	10k	
R700	ERJ3GEYJ683	68k	
R702	ERJ3GEYJ684	680k	
R703	ERJ3GEYJ103	10k	
R704	ERJ3GEYJ683	68k	

Ref. No.	Part No.	Part Name & Description	Remarks
R705	ERJ3GEYJ363	36k	
R706	ERJ3GEYJ472	4.7k	
R708	ERJ3GEYJ103	10k	
R709	ERJ3GEYJ103	10k	
R710	ERJ3GEYJ103	10k	
R711	ERJ3GEYJ224	220k	
R712	ERJ3GEYJ224	220k	
R713	ERJ3GEYJ331	330	
R714	ERJ3GEYJ123	12k	
R715	ERJ3GEYJ103	10k	
R717	ERJ3GEYJ102	1k	
R727	ERJ3GEYJ102	1k	
R728	ERJ3GEYJ102	1k	
R729	ERJ3GEYJ102	1k	
R730	ERJ3GEYJ472	4.7k	
R731	ERJ3GEYJ472	4.7k	
R732	ERJ3GEY0R00	0	
R733	ERJ3GEY0R00	0	
R734	ERJ3GEYJ472	4.7k	
R744	ERJ3GEYJ103	10k	
R745	ERJ3GEY0R00	0	
R748	ERJ3GEY0R00	0	
R749	ERJ3GEY0R00	0	
R750	ERJ3GEYJ101	100	
R751	ERJ3GEYJ103	10k	
R752	ERJ3GEYJ102	1k	
R753	ERJ3GEYJ102	1k	
R756	ERJ3GEY0R00	0	
R757	ERJ3GEYJ471	470	
R758	ERJ3GEYJ103	10k	
R759	ERJ3GEYJ103	10k	
R760	ERJ3GEYJ224	220k	
R761	ERJ3GEYJ472	4.7k	
		(CAPACITORS)	
C502	ECUV1E104ZFV	0.1	
C503	ECEA0JKA101	100	
C504	PQCUV1H104ZF	0.1	
C506	ECUV1H102KBV	0.001	
C508	ECUV1H102KBV	0.001	
C509	ECUV1H102KBV	0.001	
C510	ECUV1E104ZFV	0.1	
C511	ECUV1H103KBV	0.01	
C512	ECUV1C104KBV	0.1	
C513	ECUV1E104ZFV	0.1	
C514	ECUV1E104ZFV	0.1	
C515	ECUV1E104ZFV	0.1	
C516	ECUV1E104ZFV	0.1	
C517	ECUV1E104ZFV	0.1	
C518	ECUV1H222KBV	0.0022	
C519	ECUV1C104KBV	0.1	
C520	ECUV1H102KBV	0.001	
C522	ECUV1C104KBV	0.1	
C523	ECUV1H120JCV	12P	

Ref. No.	Part No.	Part Name & Description	Remarks
C524	ECUV1E104ZFV	0.1	
C525	ECUV1H150JCV	15P	
C526	ECEA1CKA100	10	
C527	ECUV1E104ZFV	0.1	
C528	ECEA1CKA100	10	
C529	ECUV1E104ZFV	0.1	
C530	ECUV1E104ZFV	0.1	
C531	ECUV1E104ZFV	0.1	
C532	ECUV1E104ZFV	0.1	
C533	ECUV1E104ZFV	0.1	
C534	ECEA0JKA101	100	
C535	ECUV1E104ZFV	0.1	
C536	ECUV1E104ZFV	0.1	
C537	ECUV1E104ZFV	0.1	
C538	ECUV1E104ZFV	0.1	
C539	ECUV1H101JCV	100P	
C540	ECUV1H100DCV	10P	
C541	ECUV1H100DCV	10P	
C542	ECUV1E104ZFV	0.1	
C543	ECUV1E104ZFV	0.1	
C545	ECUV1E104ZFV	0.1	
C546	ECUV1E104ZFV	0.1	
C549	ECUV1C104KBV	0.1	
C550	ECUV1H330JCV	33P	
C554	ECUV1H472KBV	0.0047	S
C559	ECUV1E104ZFV	0.1	
C561	ECUV1C104KBV	0.1	
C564	ECEA1CKA100	10	
C565	ECEA1CKA100	10	
C566	ECUV1E104ZFV	0.1	
C569	ECUV1E104ZFV	0.1	
C572	ECUV1C104KBV	0.1	
C575	ECUV1E104ZFV	0.1	
C578	ECUV1E104ZFV	0.1	
C583	ECUV1E104ZFV	0.1	
C598	ECUV1H100DCV	10P	
C599	ECUV1H100DCV	10P	
C605	ECUV1E104ZFV	0.1	
C609	ECUV1E104ZFV	0.1	
C610	ECUV1E104ZFV	0.1	
C611	ECUV1E104ZFV	0.1	
C612	ECUV1E104ZFV	0.1	
C614	ECUV1E104ZFV	0.1	
C618	ECUV1H102KBV	0.001	
C619	ECUV1E104ZFV	0.1	
C620	ECUV1E104ZFV	0.1	
C621	ECUV1E104ZFV	0.1	
C628	ECUV1E104ZFV	0.1	
C631	ECUV1E104ZFV	0.1	
C663	ECUV1E104ZFV	0.1	
C664	ECUV1E104ZFV	0.1	
C665	ECUV1E104ZFV	0.1	
C666	ECUV1E104ZFV	0.1	
C667	ECUV1C104KBV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C669	ECUV1C473KBV	0.047	
C670	ECUV1C104KBV	0.1	
C671	ECUV1H330JCV	33P	
C673	ECUV1H101JCV	100P	
C674	ECUV1C104KBV	0.1	
C675	ECUV1H560JCV	56P	
C676	ECUV1C563KBV	0.056	
C677	ECUV1H103KBV	0.01	
C679	ECUV1H222KBV	0.0022	
C681	ECUV1H102KBV	0.001	
C682	ECUV1C104KBV	0.1	
C683	ECUV1C104KBV	0.1	
C684	ECUV1C104KBV	0.1	
C685	ECUV1C104KBV	0.1	
C686	ECUV1E104ZFV	0.1	
C687	ECUV1H104ZFV	0.1	S
C689	ECEA1HKS100	10	S
C690	ECUV1E104ZFV	0.1	
C691	ECUV1E104ZFV	0.1	
C692	ECEA0JKA101	100	
C693	ECEA1CKS470	47	S
C694	ECUV1E104ZFV	0.1	
C697	ECUV1C104KBV	0.1	
C702	ECUV1E104ZFV	0.1	
C703	ECUV1E104ZFV	0.1	
C704	ECUV1E104ZFV	0.1	
C705	ECUV1E104ZFV	0.1	
C709	ECUV1H472KBV	0.0047	S
C710	ECUV1H472KBV	0.0047	S
C711	ECUV1C104KBV	0.1	
C712	ECUV1C104KBV	0.1	
C715	ECUV1E104ZFV	0.1	
C716	ECEA1CK101	100	S
C717	ECUV1E104ZFV	0.1	
C721	ECUV1C104KBV	0.1	
C722	ECUV1E104ZFV	0.1	
C723	ECUV1C104KBV	0.1	
C725	ECUV1H104ZFV	0.1	S

14.3. ANALOG BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PFLP1506MZ	ANALOG BOARD ASS'Y (RTL)	⚠
		(ICs)	
IC102	PQVIMC34119M	IC	S
IC103	C0AABB000025	IC	
		(TRANSISTORS)	
Q103	PQVTDTC143E	TRANSISTOR(SI)	S
Q104	2SD1819A	TRANSISTOR(SI)	S
Q106	2SC2235	TRANSISTOR(SI)	S
Q111	2SD1819A	TRANSISTOR(SI)	S
Q231	2SD21360R	TRANSISTOR(SI)	
Q232	2SD1819A	TRANSISTOR(SI)	S
Q233	2SD1819A	TRANSISTOR(SI)	S
Q234	2SC4081S	TRANSISTOR(SI)	
Q235	UN5213	TRANSISTOR(SI)	S
		(DIODES)	
D102	MA4056	DIODE(SI)	S
D103	MA4056	DIODE(SI)	S
D106	1SS119	DIODE(SI)	S
D107	PFVDDGS1ZB60	DIODE(SI)	
D108	1SS119	DIODE(SI)	S
D253	MAZ43000MF	DIODE(SI)	
D254	MAZ43000MF	DIODE(SI)	
		(JACK & CONNECTORS)	
CN102	PFJJ1T006Z	JACK	S
CN105	PQJP02G100Z	CONNECTOR, 2 PIN	
CN109	PQJP3G30Z	CONNECTOR, 3 PIN	S
CN201	PQJS17A10Z	CONNECTOR, 17 PIN	S
		(COILS)	
L101	PFVF2B182SDT	COIL	S
L102	PFVF2B182SDT	COIL	S
L211	PQLQZK330KT	COIL	S
L213	PQLQZK330KT	COIL	S
LF101	PFLE003	COIL	S
		(PHOTO ELECTRIC TRANSDUCERS)	
PC102	0N3181	PHOT COUPLER	⚠S
PC103	PQVIPC817CD	PHOT COUPLER	⚠S
PC104	CNC7S102	PHOT COUPLER	⚠
		(COMPONENTS PARTS)	
L103	EXCELDR35	COMPONENTS PARTS	
		(FUSE)	
F301	PFRB001501KC	FUSE	S
		(THERMISTOR)	
POS101	PQRPAR390N	THERMISTOR	

Ref. No.	Part No.	Part Name & Description	Remarks
		(TRANSFORMER)	
T101	PFLT8E003	TRANSFORMER	⚠S
		(VARISTORS)	
SA101	PFRZRA311P6T	VARISTOR (SURGE ABSORBER)	S
SA102	PFRZRA102P6T	VARISTOR (SURGE ABSORBER)	⚠S
ZNR101	ERZVA7D121	VARISTOR	
		(RELAY)	
RL101	PFSL001Z	RELAY	⚠
		(RESISTORS)	
C503	ERJ3GEY0R00	0	
R103	ERDS1TJ473	47k	S
R104	ERDS1TJ103	10k	S
R110	ERDS2TJ102	1k	S
R112	ERJ3GEYJ563	56k	
R113	ERJ3GEYJ153	15k	
R114	ERJ3GEY0R00	0	
R115	ERJ3GEYJ272	2.7k	
R116	ERJ3GEYJ472	4.7k	
R118	ERJ3GEYJ563	56k	
R119	ERJ3GEYJ114	110k	
R125	ERJ3GEYJ563	56k	
R133	ERJ3GEYJ153	15k	
R134	ERJ3GEYJ103	10k	
R136	ERJ3GEYJ154	150k	
R137	ERJ3GEYJ114	110k	
R141	ERJ3GEYJ222	2.2k	
R142	ERJ3GEYJ393	39k	
R157	ERJ3GEYJ103	10k	
R159	ERDS2TJ393	39k	S
R160	ERJ3GEYJ153	15k	
R161	ERJ3GEYJ153	15k	
R162	ERJ3GEYJ472	4.7k	
R163	ERJ3GEYJ473	47k	
R167	ERJ3GEYJ153	15k	
R168	ERJ3GEYJ682	6.8k	
R172	ECUV1H103KBV	0.01	
R185	ERJ3GEYJ103	10k	
R186	ERJ3GEYJ103	10k	
R191	ERJ3GEY0R00	0	
R202	ERJ3GEYJ102	1k	
R238	ERDS1TJ101	100	S
R242	PQ4R10XJ220	22	S
R243	PQ4R10XJ220	22	S
R244	PQ4R10XJ220	22	S
R245	PQ4R10XJ220	22	S
R247	ERJ3GEYJ223	22k	
R248	ERJ3GEYJ561	560	
R261	ERDS2TJ221	220	S
R268	ERJ3GEYJ222	2.2k	

Ref. No.	Part No.	Part Name & Description	Remarks
R269	ERJ3GEYJ103	10k	
R270	ERJ3GEYJ622	6.2k	
R271	ERJ3GEYJ393	39k	
R272	ERJ3GEYJ123	12k	
R281	ERJ3GEYJ103	10k	
R282	ERJ3GEYJ222	2.2k	
R283	ERJ3GEY0R00	0	
R284	ERG2SJ102	1k	
R285	ERG2SJ102	1k	
R286	ERG2SJ102	1k	
R287	ERJ3GEYJ272	2.7k	
R288	ERJ3GEYJ104	100k	
		(CAPACITORS)	
C101	ECQE2E105KZ	1	S
C109	ECEA1HN4R7S	4.7	S
C110	ECUV1H103KBV	0.01	
C112	ECUV1C104KBV	0.1	
C114	ECUV1H123KBV	0.012	
C115	ECUV1H391JCV	390P	S
C116	ECJ1VC1H151J	150P	
C117	ECEA1HKA4R7	4.7	
C118	ECUV1C104KBV	0.1	
C123	ECEA1CKA100	10	
C130	ECEA1HKA4R7	4.7	
C131	ECUV1C273KBV	0.027	
C132	ECUV1H102KBV	0.001	
C134	ECUV1H333KBV	0.033	S
C135	ECUV1E104ZFV	0.1	
C154	ECUV1H681JCV	680P	S
C155	ECUV1H681JCV	680P	S
C156	ECKD2H681KB	680P	S
C157	ECKD2H681KB	680P	S
C158	ECA1CM221	220P	
C159	ECEA1CKA100	10	
C160	ECUV1E104ZFV	0.1	
C168	ECUV1E104ZFV	0.1	
C231	ECUV1H103KBV	0.01	
C301	ECUV1E104ZFV	0.1	
C305	ECUV1H682KBV	0.0068	S
C306	ECUV1H391JCV	390P	S
C501	ECUV1H103KBV	0.01	
C502	ECUV1H103KBV	0.01	
C508	ECEA1CKS470	47	S

14.4. OPERATION BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PFWP2FPG376M	OPERATION BOARD ASS'Y (RTL)	
		(ICs)	
IC301	C1ZBZ0002089	IC	
IC351	PQVINJM4580M	IC	
		(DIODES)	
LED301	LNJ801LPDJA	LED	
LED302	PQVDSLR325MC	LED	S
		(SWITCHES)	
SW301	PQSH1A105Z	PUSH SWITCH	S
SW302	PQSH1A105Z	PUSH SWITCH	S
SW303	PQSH1A105Z	PUSH SWITCH	S
SW304	PQSH1A105Z	PUSH SWITCH	S
SW305	PQSH1A105Z	PUSH SWITCH	S
SW306	PQSH1A105Z	PUSH SWITCH	S
SW307	PQSH1A105Z	PUSH SWITCH	S
SW308	PQSH1A105Z	PUSH SWITCH	S
SW309	PQSH1A105Z	PUSH SWITCH	S
SW310	PQSH1A105Z	PUSH SWITCH	S
SW311	PQSH1A105Z	PUSH SWITCH	S
SW312	PQSH1A105Z	PUSH SWITCH	S
SW313	PQSH1A105Z	PUSH SWITCH	S
SW314	PQSH1A105Z	PUSH SWITCH	S
SW315	PQSH1A105Z	PUSH SWITCH	S
SW316	PQSH1A105Z	PUSH SWITCH	S
SW317	PQSH1A105Z	PUSH SWITCH	S
SW318	PQSH1A105Z	PUSH SWITCH	S
SW319	PQSH1A105Z	PUSH SWITCH	S
SW321	PQSH1A105Z	PUSH SWITCH	S
SW326	PQSH1A105Z	PUSH SWITCH	S
SW327	PQSH1A105Z	PUSH SWITCH	S
SW328	PQSH1A105Z	PUSH SWITCH	S
SW329	PQSH1A105Z	PUSH SWITCH	S
SW330	PQSH1A105Z	PUSH SWITCH	S
SW331	PQSH1A105Z	PUSH SWITCH	S
SW332	PQSH1A105Z	PUSH SWITCH	S
SW333	PQSH1A105Z	PUSH SWITCH	S
SW334	PQSH1A105Z	PUSH SWITCH	S
SW335	PQSH1A105Z	PUSH SWITCH	S
SW336	PQSH1A105Z	PUSH SWITCH	S
SW337	PQSH1A105Z	PUSH SWITCH	S
SW351	K0C111A00009	SWITCH, DOCUMENT TOP	
		(CONNECTORS)	
CN301	PQJP8G43Y	CONNECTOR, 8 PIN	S
CN303	PQJP3G43Z	CONNECTOR, 3 PIN	S
		(LIQUID CRYSTAL DISPLAY)	
CN302	L5DAAFB00001	LIQUID CRYSTAL DISPLAY	
		(COILS)	

Ref. No.	Part No.	Part Name & Description	Remarks
L351	PQLQR4RB601D	COIL	
L352	PQLQR4RB601D	COIL	
		(PHOTO ELECTRIC TRANSDUCER)	
PS301	PFVISG257	PHOTO SENSOR	S
		(RESISTORS)	
J353	ERJ3GEY0R00	0	
R302	ERJ3GEYJ271	270	
R303	ERJ3GEYJ183	18k	
R305	ERJ3GEYJ222	2.2k	
R306	ERJ3GEYJ122	1.2k	
R307	ERJ3GEYJ821	820	
R312	ERJ3GEYJ271	270	
R313	ERJ3GEYJ331	330	
R314	ERJ3GEYJ563	56k	
R315	ERJ3GEYJ101	100	
R316	ERJ3GEYJ472	4.7k	
R317	ERJ3GEYJ101	100	
R318	ERJ3GEYJ4R7	4.7	
R320	ERJ3GEYJ221	220	
R321	ERJ3GEYJ680	68	
R322	ERJ3GEYJ181	180	
R323	ERJ3GEYJ181	180	
R324	ERJ3GEYJ181	180	
R351	ERJ3GEYJ331	330	
R352	ERJ3GEYJ332	3.3k	
R353	ERJ3GEYJ332	3.3k	
R354	ERJ3GEYJ103	10k	
R355	ERJ3GEYJ103	10k	
R356	ERJ3GEYJ273	27k	
R357	ERJ3GEYJ273	27k	
R358	ERJ3GEYJ104	100k	
R359	ERJ3GEYJ683	68k	
R361	ERJ3GEY0R00	0	
		(CAPACITORS)	
C302	ECUV1C104KBV	0.1	S
C303	ECEA0JKS101	100	
C304	ECUV1C104KBV	0.1	S
C305	ECUV1H101JCV	100P	S
C308	ECUV1H331JCV	330P	S
C309	ECUV1H331JCV	330P	S
C310	ECUV1C104KBV	0.1	S
C311	ECUV1C104KBV	0.1	S
C314	ECUV1C104KBV	0.1	S
C316	ECUV1H103KBV	0.01	S
C317	ECUV1H103KBV	0.01	S
C322	ECUV1C104KBV	0.1	S
C351	ECEA0JKS101	100	
C352	ECUV1H103KBV	0.01	S
C353	ECUV1C104KBV	0.1	S
C354	ECUV1C104KBV	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C355	ECJ1VC1H100D	10P	
C356	ECUV1H102KBV	0.001	S
C357	ECUV1C104KBV	0.1	S
C358	ECUV1C104KBV	0.1	S

14.5. POWER SUPPLY BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB4	N0AB3GJ00004	POWER SUPPLY BOARD ASS'Y (RTL)	⚠
		(ICs)	
IC101	PFVIFA5317P	IC	S
IC201	AN1431T	IC	
IC202	PFVIPQ05RD11	IC	S
		(TRANSISTOR)	
Q101	2SK2543	TRANSISTOR(SI)	⚠
		(DIODES)	
D101	PFVD1N4005	DIODE(SI)	⚠
D102	PFVD1N4005	DIODE(SI)	⚠
D103	PFVD1N4005	DIODE(SI)	⚠
D104	PFVD1N4005	DIODE(SI)	⚠
D105	PFVDAG01A	DIODE(SI)	
D106	MA165	DIODE(SI)	
D107	MA4220	DIODE(SI)	
D108	PQVDERA1802	DIODE(SI)	S
D201	PFVDSF5LC20U	DIODE(SI)	S
D202	PFVD21DQ10	DIODE(SI)	S
		(CONNECTORS)	
CN31	PQJP2D98Z	CONNECTOR, 2 PIN	⚠
CN301	PQJP7G30Y	CONNECTOR, 7 PIN	⚠ S
CN302	PQJP2G30Y	CONNECTOR, 2 PIN	⚠ S
		(COIL)	
L101	ELF15N008A	COIL	⚠
		(COMPONENTS PARTS)	
L103	EXCELDR35	COMPONENTS PARTS	
		(FUSE)	
F101	PQBA1C50NBKL	FUSE	⚠
		(PHOTO ELECTRIC TRANSDUCER)	
PC101	0N3131	PHOTO COUPLER	⚠
		(TRANSFORMER)	
T101	PFLT239V017	TRANSFORMER	⚠ S

Ref. No.	Part No.	Part Name & Description	Remarks
		(VARIABLE RESISTOR)	
VR201	EVNDXAA03B53	VARIABLE RESISTOR	
		(VARISTOR)	
ZNR101	ERZV07D471	VARISTOR	⚠
		(RESISTORS)	
R101	ERDS2J105	1M	⚠
R102	ERDS2J274	270k	
R103	ERDS2J274	270k	
R104	ERG2SJ473	47k	
R105	ERX2SJR22	0.22	
R106	ERG2SJ470	47	
R108	ERDS1FVJ220	22	
R109	ERDS2TJ100	10	
R121	ERJ3GEYJ103	10k	
R122	ERJ3GEYJ821	820	
R124	ERJ3GEYJ201	200	
R125	ERJ3GEYJ103	10k	
R126	ERJ3GEYF562	5.6k	
R127	ERJ3GEYJ182	1.8k	
R128	PQ4R10XJ181	180	S
R136	PQ4R10XJ473	47k	S
R137	PQ4R10XJ473	47k	S
R203	ERDS1FVJ470	47	
R221	ERJ3GEYJ222	2.2k	
R222	ERJ3GEYJ222	2.2k	
R223	ERJ3GEYJ101	100	
R224	ERJ3GEYJ273	27k	
R225	ERJ3GEYJ332	3.3k	
		(CAPACITORS)	
C101	ECQU2A224MV	0.22	⚠
C102	ECQU2A104MV	0.1	⚠
C103	PFKD2E3KH102	0.001	⚠ S
C105	PFKDE2GA222M	0.0022	⚠ S
C106	PFEU220SX220	220	S
C108	ECKN3A222KBP	0.0022	
C109	PFCEA35A47M	47	S
C119	ECKD3A221KBP	220P	
C121	ECUV1H472KBV	0.0047	S
C122	ECUV1A224KBV	0.22	S
C123	ECUV1H561JCV	560P	S
C124	ECUV1E104KBV	0.1	S
C201	PFCEA35F471	470	S
C202	ECKN3A102KBP	0.001	
C203	PFCEA35F471	470	S
C204	PFCEA35A47M	47	S
C205	PFCEA50A1M	1	S
C206	ECKN3A102KBP	0.001	

14.6. CORDLESS BASE BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB5	PFLP1507MZ	CORDLESS BASE BOARD ASS'Y (RTL)	
PCB5-1	PQLP10254Z	RF UNIT	S
		(ICs)	
IC301	C0CBABD00013	IC	
IC302	C0CBABD00017	IC	
IC501	C2HBBG000093	IC	
IC551	PQVIS93C56DJ	IC	S
		(TRANSISTORS)	
Q602	2SC39300CL	TRANSISTOR(SI)	
Q614	PQVTDTC143E	TRANSISTOR(SI)	S
		(DIODES)	
D306	PQVDHRU0302A	DIODE(SI)	S
D511	PQVDHRU0302A	DIODE(SI)	S
		(CONNECTOR)	
CN1	PQJP13G30Z	CONNECTOR, 13 PIN	S
		(BATTERY TERMINALS)	
G601	PQJT10152Z	BATTERY TERMINAL	
G603	PQJT10152Z	BATTERY TERMINAL	
G604	PQJT10152Z	BATTERY TERMINAL	
G606	PQJT10152Z	BATTERY TERMINAL	
		(COIL)	
L501	PQLQR2KA213	COIL	S
		(CERAMIC FILTER)	
L601	PFVF1B471SB	CERAMIC FILTER	S
		(CRYSTAL OSCILLATOR)	
X501	H0J819400004	CRYSTAL OSCILLATOR	
		(RESISTORS)	
JJ301	ERJ3GEY0R00	0	
JJ304	ERJ3GEY0R00	0	
L511	ERJ3GEY0R00	0	
C441	ERJ3GEY0R00	0	
R344	ERJ3GEYJ103	10k	
R345	ERJ3GEYJ102	1k	
R383	ERJ3GEY0R00	0	
R384	ERJ3GEYJ103	10k	
R385	ERJ3GEYJ102	1k	
R431	ERJ3GEYJ222	2.2k	
R434	ERJ3GEYJ102	1k	
R553	ERJ3GEYJ103	10k	
R603	ERJ3GEYJ472	4.7k	

Ref. No.	Part No.	Part Name & Description	Remarks
R604	ERJ3GEYJ472	4.7k	
R612	ERJ3GEYJ472	4.7k	
R613	ERJ3GEYJ472	4.7k	
R615	ERJ3GEYJ102	1k	
R616	ERJ3GEYJ182	1.8k	
R617	ERJ3GEYJ104	100k	
R618	ERJ3GEYJ471	470	
R619	ERJ3GEYJ100	10	
R620	ERJ3GEYJ101	100	
R650	ERJ3GEYJ332	3.3k	
R652	ERJ3GEYJ151	150	
R653	ERJ3GEYJ151	150	
R654	ERJ3GEYJ151	150	
R762	ERJ3GEYJ103	10k	
R765	ERJ3GEYJ181	180	
R770	ERJ3GEY0R00	0	
R771	ERJ3GEYJ181	180	
R772	ERJ3GEYJ181	180	
R773	ERJ3GEYJ101	100	
R774	ERJ3GEYJ181	180	
R777	ERJ3GEYJ101	100	
R778	ERJ3GEYJ101	100	
R779	ERJ3GEYJ101	100	
R780	ERJ3GEYJ102	1k	
		(CAPACITORS)	
C303	ECUV1C104KBV	0.1	S
C304	ECEA1CKA100	10	
C333	ECUV1C104KBV	0.1	S
C414	ECEA1CKA100	10	
C415	ECUV1C104KBV	0.1	S
C431	ECUV1H272KBV	0.0027	S
C432	ECUV1C104KBV	0.1	S
C445	ECUV1C104KBV	0.1	S
C501	ECEA0JKA221	220	
C502	ECUV1C104KBV	0.1	S
C503	ECUV1C104KBV	0.1	S
C506	ECUV1H070CCV	7P	
C507	ECUV1H070CCV	7P	
C513	ECEA0JKA101	100	
C514	ECUV1C104KBV	0.1	S
C515	ECEA1CKA100	10	
C516	ECUV1C104KBV	0.1	S
C551	ECUV1C104KBV	0.1	S
C601	ECEA0JKA101	100	
C602	ECUV1H103KBV	0.01	S
C603	ECUV1H020CCV	2P	
C607	ECUV1H330JCV	33P	S
C613	ECUV1C104KBV	0.1	S
C618	ECUV1H030CCV	3P	S
C620	ECUV1C104KBV	0.1	S
C621	ECUV1H030CCV	3P	S
C622	ECUV1C104KBV	0.1	S
C623	ECUV1C104KBV	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C624	ECUV1C104KBV	0.1	S
C625	ECUV1H150JCV	15P	S
C626	ECUV1H150JCV	15P	S
C681	ECUV1H010CCV	1P	
C682	ECUV1H010CCV	1P	
C694	ECUV1H101JCV	100P	S
C698	ECUV1H101JCV	100P	S
C699	ECUV1H101JCV	100P	S
C770	ECUV1H101JCV	100P	S
C772	ECUV1H680JCV	68P	S
C773	ECUV1H680JCV	68P	S
C774	ECUV1H101JCV	100P	S
C775	ECUV1H101JCV	100P	S
C776	ECUV1H680JCV	68P	S
C780	ECUV1C104KBV	0.1	S
C781	ECA0JM102B	0.001	
C904	ECUV1C104KBV	0.1	S
C905	ECUV1C104KBV	0.1	S
C909	ECUV1C104KBV	0.1	S

14.7. HANDSET BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB6	PFWPFPG376MR	HANDSET BOARD ASS'Y (RTL)	
PCB6-1	PQLP10254Z	RF UNIT	S
		(ICs)	
IC201	C2HBBG000092	IC	
IC202	PFWIFPG371MR	IC	
IC203	C0CBABD00011	IC	
IC204	PQVIMM1385EN	IC	S
IC205	C0EBF0000157	IC	
		(TRANSISTORS)	
Q201	PQVTDTC143E	TRANSISTOR(SI)	S
Q202	PQVTDTC143E	TRANSISTOR(SI)	S
Q203	UN5117	TRANSISTOR(SI)	S
Q204	2SC39300CL	TRANSISTOR(SI)	
Q205	2SD1819A	TRANSISTOR(SI)	
Q206	PQVTDTC143E	TRANSISTOR(SI)	S
Q207	2SD1819A	TRANSISTOR(SI)	
Q211	PQVTDTA143TU	TRANSISTOR(SI)	
		(DIODES)	
D201	MA2ZD1400	DIODE(SI)	
D203	MA2J11100L	DIODE(SI)	S
D206	PQVDMD5S	DIODE(SI)	
D211	MAZ81000M	DIODE(SI)	
D214	MA2J11100L	DIODE(SI)	S
D215	MA2ZD1400	DIODE(SI)	
D216	MA2J11100L	DIODE(SI)	S

Ref. No.	Part No.	Part Name & Description	Remarks
		(LEDs)	
LED201	PQVDSML310MT	LED	S
LED202	PQVDSML310MT	LED	S
LED203	PQVDSML310MT	LED	S
LED204	PQVDSML310MT	LED	S
LED205	PQVDSML310MT	LED	S
LED206	PQVDSML310MT	LED	S
LED207	PQVDSML310MT	LED	S
		(COILS)	
L203	J0JCC0000186	COIL	
R242	PQLQR4RB601D	COIL	
R243	PQLQR4RB601D	COIL	
		(CONNECTORS)	
CN201	PQJS22A12Z	CONNECTOR, 22 PIN	S
CN203	PQJJ1J007Z	JACK	S
		(BATTERY TERMINALS)	
BATT1	PQJT10152Z	CHARGE TERMINAL	
BATT2	PQJT10152Z	CHARGE TERMINAL	
G1	PQJT10152Z	CHARGE TERMINAL	
G3	PQJT10152Z	CHARGE TERMINAL	
G4	PQJT10152Z	CHARGE TERMINAL	
G6	PQJT10152Z	CHARGE TERMINAL	
		(OTHERS)	
E101	L0CBAB000044	MICROPHONE	
E102	PQHX11152Z	INSULATOR, PET SHEET	
RA201	EXRV8V104JV	COMPONENTS PARTS	S
X201	H0J819400004	CRYSTAL OSCILLATOR	
		(RESISTORS)	
R201	ERJ3GEYJ331	330	
R202	ERJ3GEYJ331	330	
R203	ERJ3GEYJ331	330	
R204	ERJ3GEYJ331	330	
R205	ERJ3GEYJ271	270	
R206	ERJ3GEYJ271	270	
R207	ERJ3GEYJ271	270	
R209	ERJ3GEYJ102	1k	
R210	ERJ3GEYJ103	10k	
R211	ERJ3GEYJ103	10k	
R212	ERJ3GEYJ101	100	
R213	ERJ3GEYJ101	100	
R217	ERJ3GEYF434	430k	S
R218	ERJ3GEYF824	820k	S
R222	ERJ3GEYJ101	100	
R223	ERJ3GEYJ103	10k	
R224	ERJ3GEYJ103	10k	
R225	ERJ3GEYJ472	4.7k	
R228	ERJ3GEYJ224	220k	
R229	ERJ3GEYJ102	1k	
R230	ERJ3GEYJ102	1k	

Ref. No.	Part No.	Part Name & Description	Remarks
R231	ERJ3GEYJ102	1k	
R232	ERJ3GEYJ103	10k	
R233	ERJ3GEY0R00	0	
R234	ERJ3GEYJ225	2.2M	
R235	ERJ3GEYJ225	2.2M	
R236	ERJ3GEYJ183	18k	
R244	ERJ3GEYJ393	39k	
R245	ERJ3GEYJ103	10k	
R246	ERJ3GEYJ153	15k	
R247	ERJ3GEYJ391	390	
R248	ERJ3GEYJ393	39k	
R249	ERJ3GEYJ122	1.2k	
R250	ERJ3GEYJ122	1.2k	
R253	ERJ3GEYJ222	2.2k	
R260	ERJ3GEYJ103	10k	
R265	ERJ3GEYJ103	10k	
R270	ERJ3GEYJ104	100k	
R276	ERJ3GEYJ471	470	
R277	ERJ3GEYJ471	470	
R278	ERJ3GEYJ104	100k	
R279	ERJ3GEYJ101	100	
R280	ERJ3GEYJ182	1.8k	
R281	ERJ3GEYJ104	100k	
R302	ERJ3GEYJ180	18	
R303	ERJ3GEYJ180	18	
R306	ERJ3GEYJ104	100k	
R318	ERJ3GEYJ331	330	
R319	ERJ3GEYJ331	330	
R320	ERJ3GEYJ331	330	
R321	ERJ3GEYJ331	330	
R322	ERJ3GEYJ331	330	
R323	ERJ3GEYJ331	330	
R324	ERJ3GEYJ331	330	
C301	ERJ3GEY0R00	0	
L209	PQ4R10XJ000	0	S
		(CAPACITORS)	
C203	ECUV1C104ZFV	0.1	
C205	ECUV1H101JCV	100p	
C206	ECUV1C104KBV	0.1	
C207	ECUV1C104KBV	0.1	
C208	ECUV1C104KBV	0.1	
C209	ECUV1C104KBV	0.1	
C210	ECUV1C104KBV	0.1	
C211	ECUV1A474KBV	0.47	
C212	ECUV1A474KBV	0.47	
C213	EEE0JA101SP	100	
C214	ECUV1C104ZFV	0.1	
C215	ECUV1A474KBV	0.47	
C217	ECUV1C104ZFV	0.1	
C218	ECUV1C104ZFV	0.1	
C220	EEE0JA101SP	100	
C221	ECUV1C104ZFV	0.1	
C222	ECUV1C104ZFV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C223	ECST0JY106	10	
C224	ECUV1C104ZFV	0.1	
C225	ECUV1A105ZFV	1	
C226	ECUV1C104ZFV	0.1	
C227	ECUV1C104ZFV	0.1	
C228	ECUV1C104ZFV	0.1	
C229	ECUV1A105ZFV	1	
C230	ECUV1E333KBV	0.033	
C231	ECUV1A224KBV	0.22	
C232	ECUV1E333KBV	0.033	
C233	ECUV1A105ZFV	1	
C234	ECUV1A224KBV	0.22	
C236	ECUV1H050CCV	5p	
C237	ECUV1H050CCV	5p	
C239	ECUV1C104ZFV	0.1	
C242	ECUV1C104ZFV	0.1	
C243	ECUV1H103KBV	0.01	
C244	ECUV1C104ZFV	0.1	
C255	ECUV1A224KBV	0.22	
C257	ECST0JY226	22	
C262	ECUV1A105ZFV	1	
C267	ECST0JX226	22	
C270	ECST0JY475	4.7	
C274	ECUV1C104ZFV	0.1	
C277	ECUV1C823KBV	0.082	
C280	ECUV1C104ZFV	0.1	
C282	ECUV1C104ZFV	0.1	
C285	ECUV1C105ZF	1	
C291	ECUV1C104ZFV	0.1	
C294	ECUV1C104ZFV	0.1	
C296	ECUV1H102KBV	0.001	S
C297	ECUV1H471JCV	470p	
C298	ECUV1H101JCV	100p	
C299	ECUV1H101JCV	100p	
C303	ECUV0J106KB	10	
C304	ECUV1C104ZFV	0.1	
C305	ECUV1H030CCV	3p	
C306	ECUV1C104ZFV	0.1	
C307	ECUV1C104KBV	0.1	
C308	ECUV1H030CCV	3p	
C309	ECUV1C104KBV	0.1	
C315	ECUV1H030CCV	3p	
C316	ECUV1H221JCV	220p	
C317	ECUV1H010CCV	1p	
L201	ECUV1H010CCV	1p	

14.8. SENSOR BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB7	PFWP3FPG376M	SENSOR BOARD ASS'Y (RTL)	
		(CONNECTOR)	
CN401	PQJP3G43Z	CONNECTOR, 3 PIN	S
		(SWITCHES)	
SW401	K0MA11000030	SWITCH, FILM DETECTION	
SW402	K0C111A00008	SWITCH, PAPER TOP	

14.9. FIXTURES AND TOOLS

Ref. No.	Part No.	Part Name & Description	Remarks
EC1	PQZZ11K4Z	EXTENSION CORD, 11 PIN	
EC2	PQZZ7K5Z	EXTENSION CORD, 7 PIN	
EC3	PQZZ2K13Z	EXTENSION CORD, 2 PIN	
EC4	PFZZ17K2Z	EXTENSION CORD, 17 PIN	
EC5	PQZZ2K12Z	EXTENSION CORD, 2 PIN	
EC6	PQZZ3K5Z	EXTENSION CORD, 3 PIN	
EC7	PQZZ7K5Z	EXTENSION CORD, 7 PIN	
EC8	PQZZ8K18Z	EXTENSION CORD, 8 PIN	
EC9	PFZZ5K13Z	EXTENSION CORD, 5 PIN	
EC10	PQZZ5K6Z	EXTENSION CORD, 5 PIN	
EC11	PQZZ3K5Z	EXTENSION CORD, 3 PIN	
EC12	PQZZ13K9Z	EXTENSION CORD, 13 PIN	
EC13	PQZZ3K5Z	EXTENSION CORD, 3 PIN	
	KM79811245C0	BASIC FACSIMILE TECHNIQUE (for training service technicians)	

Note:

**Tools and Extension Cords are useful for servicing.
(They make servicing easy.)**

15. PRINTED CIRCUIT BOARD

15.1. DIGITAL BOARD (PCB1)

15.1.1. Bottom View

15.1.2. Component View

15.2. ANALOG BOARD (PCB2)

15.2.1. Bottom View

15.2.2. Component View

15.3. OPERATION BOARD (PCB3)

15.4. POWER SUPPLY BOARD (PCB4)

15.5. CORDLESS BASE BOARD (PCB5)

15.5.1. Bottom View

15.5.2. Component View

15.6. HANDSET BOARD (PCB6)

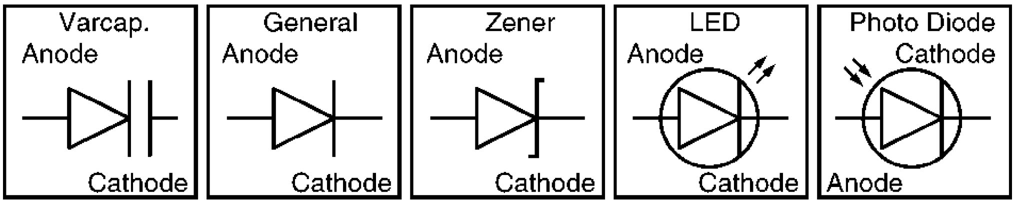
15.7. SENSOR BOARD (PCB7)

15.8. RF UNIT (PCB5-1/PCB6-1)

16. FOR THE SCHEMATIC DIAGRAMS

Note:

1. **DC voltage measurements are taken with an oscilloscope or a tester with a ground.**
2. **The schematic diagrams and circuit board may be modified at any time with the development of new technology.**


Varcap.
Anode
Cathode
General
Anode
Cathode
Zener
Anode
Cathode
LED
Anode
Cathode
Photo Diode
Cathode
Anode

Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

17. SCHEMATIC DIAGRAM

17.1. DIGITAL BOARD (PCB1)

17.2. ANALOG BOARD (PCB2)

17.3. OPERATION BOARD (PCB3)

17.4. POWER SUPPLY BOARD (PCB4)

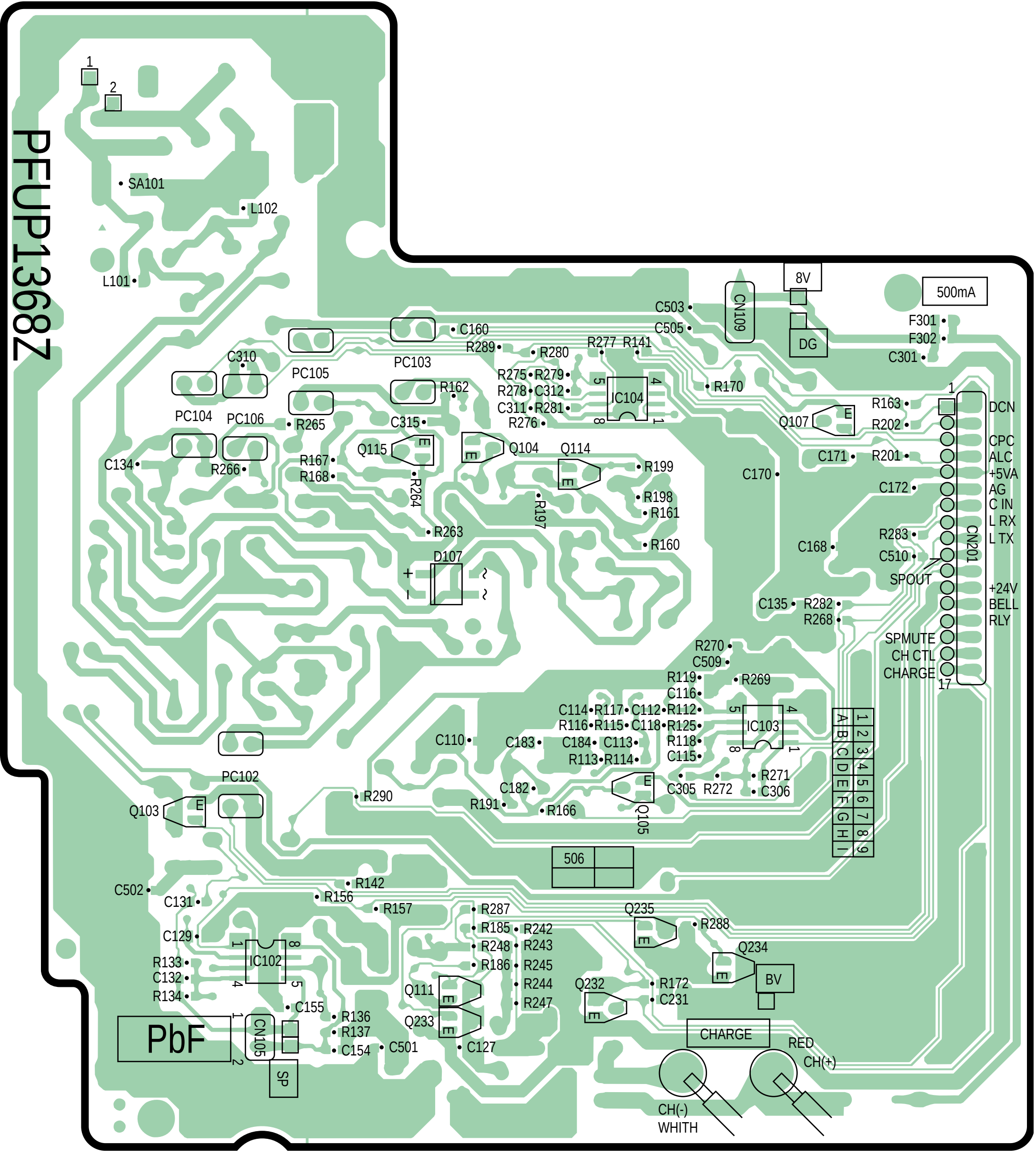
17.5. CORDLESS BASE BOARD (PCB5)

17.6. HANDSET BOARD (PCB6)

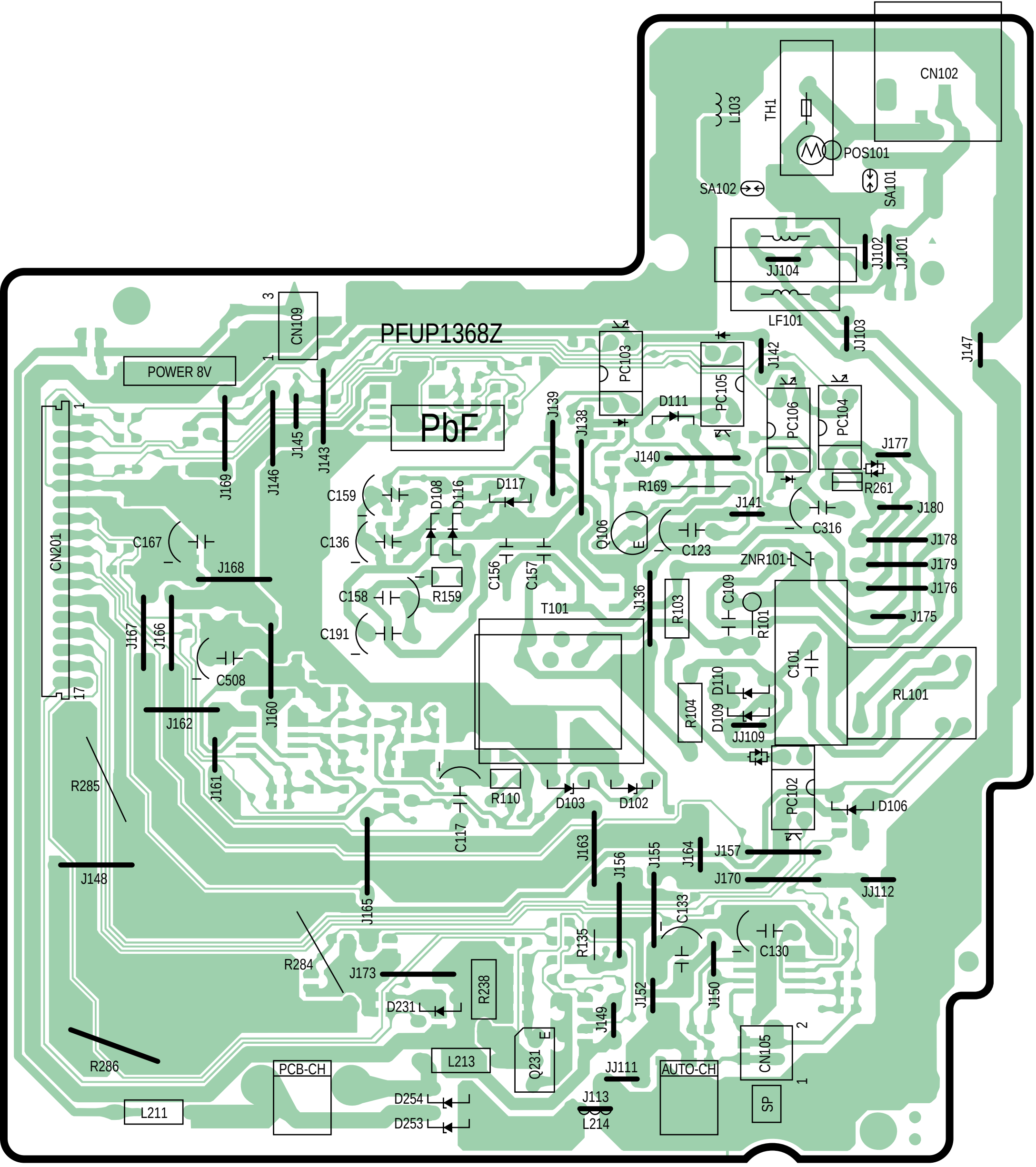
17.7. SENSOR BOARD (PCB7)

17.8. RF UNIT (PCB5-1/PCB6-1)

Y / KXFPG376 / KXFPG377

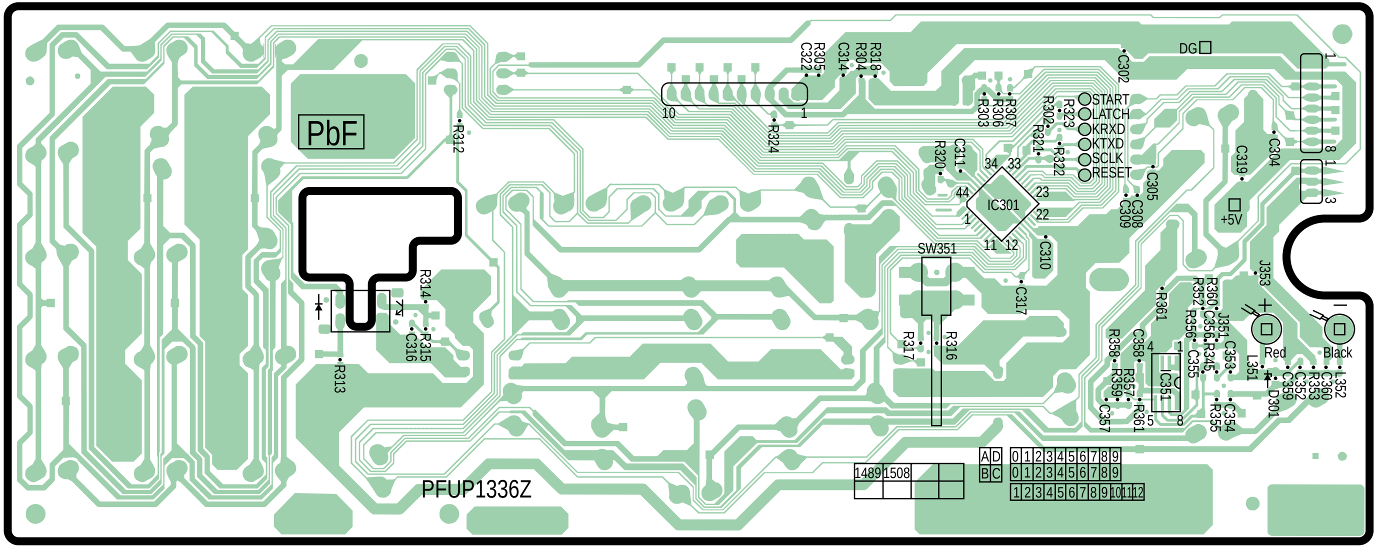

PFUP1368Z
1
2
SA101
L102
L101
8V
500mA
CN109
DG
C503
C505
F301
F302
C301
C160
R289
R280
R277
R141
C310
PC105
PC103
R162
R275
R279
R278
C312
C311
R281
R276
IC104
5
4
8
1
R170
R163
R202
R201
Q107
E
DCN
CPC
ALC
+5VA
AG
C IN
L RX
L TX
CN201
+24V
BELL
RLY
SPMUTE
CH CTL
CHARGE
17
PC104
PC106
R265
C315
Q115
Q104
Q114
C134
R266
R167
R168
R264
R197
R199
R198
R161
R160
C171
C170
C172
R283
C510
SPOUT
C168
R263
D107
+
-
~
C135
R282
R268
R270
C509
R269
R119
C116
C114
R117
C112
R112
R116
R115
C118
R125
IC103
C110
C183
C184
C113
R118
R113
R114
C115
PC102
C182
C305
R272
R271
C306
Q103
R290
R191
R166
Q105
A B C D E F G H I
1 2 3 4 5 6 7 8 9
506
C502
R142
R156
C131
R157
R287
R185
R242
R248
R243
R186
R245
R244
R247
Q235
R288
Q234
BV
C129
R133
C132
R134
IC102
Q111
Q233
Q232
R172
C231
C155
R136
R137
C154
C501
C127
CHARGE
RED
CH(+)
PbF
CN105
SP
CH(-)
WHITH

KX-FPG376/KX-FPG377 : ANALOG BOARD : BOTTOM VIEW

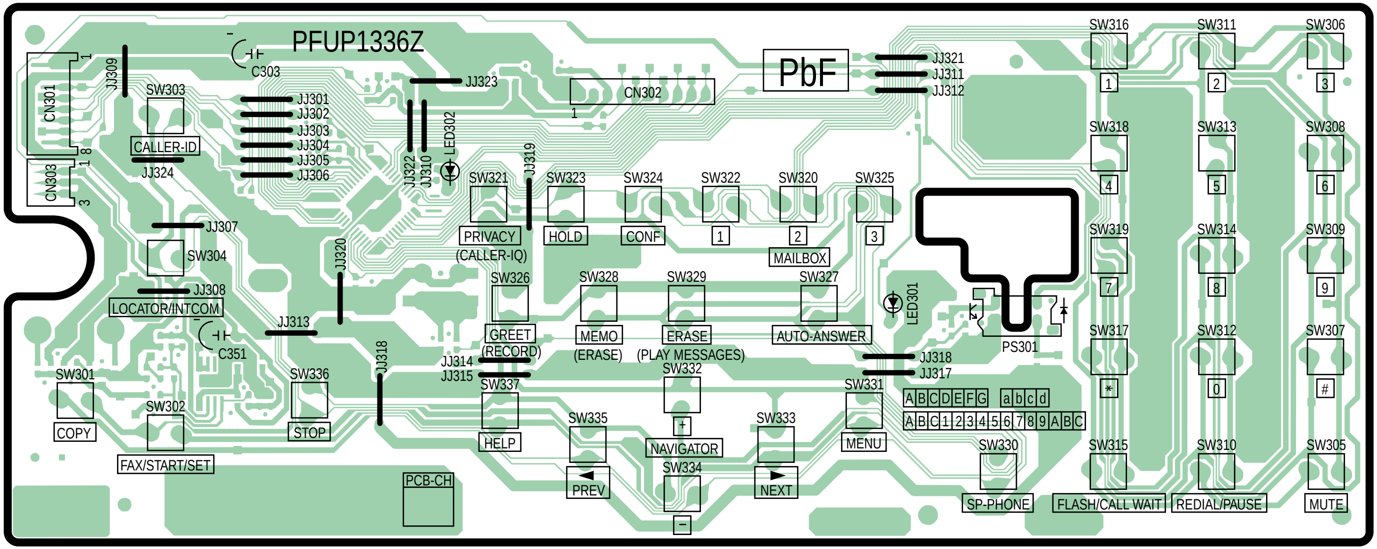

CN102
L103
TH1
POS101
SA102
SA101
JJ102
JJ101
JJ104
LF101
J147
JJ103
3
CN109
1
PFUP1368Z
POWER 8V
PC103
J142
PC105
PC106
PC104
D111
PbF
J139
J138
1
J169
J146
J145
J143
J140
J177
R261
R169
C159
D108
D116
D117
J141
C316
J180
CN201
C167
C136
Q106
E
C123
J178
J168
ZNR101
J179
C156
C157
C158
R159
C109
J176
R103
J136
T101
C191
R101
J175
J167
J166
C508
J160
C101
D110
RL101
17
D109
R104
J162
JJ109
J161
R285
R110
D103
D102
PC102
D106
C117
J163
J156
J155
J164
J157
J148
J170
JJ112
J165
C133
C130
R135
R284
J173
R238
J152
J150
D231
J149
2
CN105
E
Q231
1
L213
R286
JJ111
PCB-CH
AUTO-CH
J113
SP
L211
D254
D253
L214

KX-FPG376/KX-FPG377 : ANALOG BOARD : COMPONENT VIEW

(Bottom View)

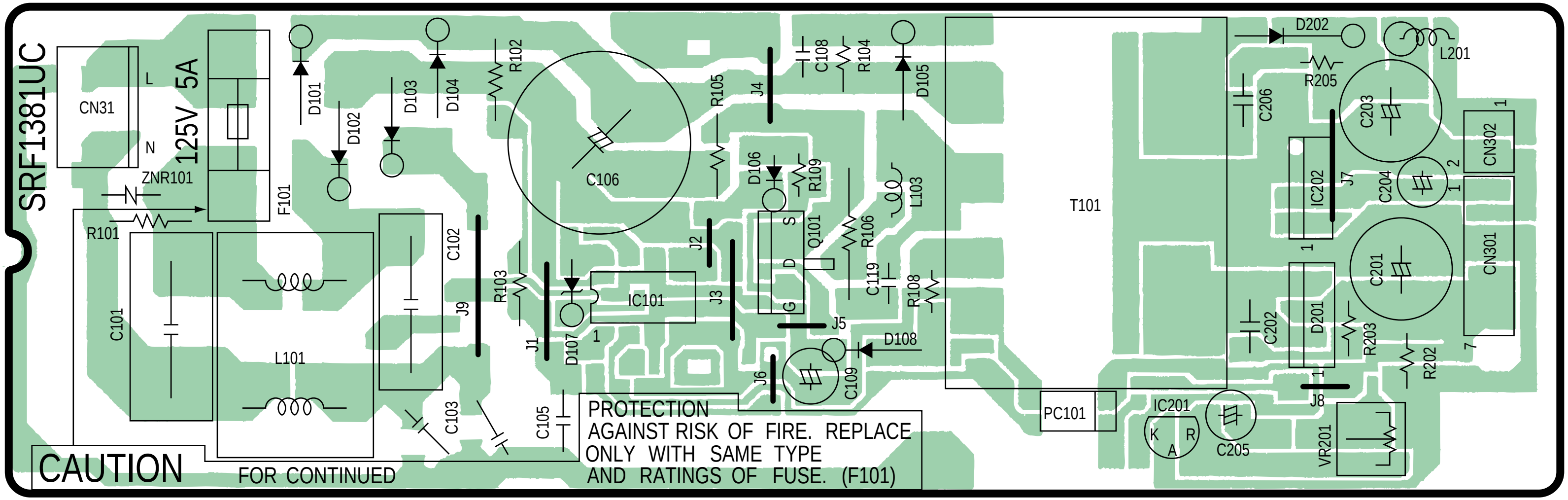

PbF
PFUP1336Z
R305
C322
C314
R304
R318
10
1
R324
R312
R303
R306
R307
R302
R323
R321
R322
R320
C311
C302
DG
START
LATCH
KRXD
KTXD
SCLK
RESET
34
33
44
23
IC301
22
1
11
12
C305
C308
C309
C310
C317
SW351
R317
R316
R314
C316
R315
R313
C319
C304
+5V
J353
R361
R360
R352
R356
J351
C356
R345
C353
C355
R358
R359
C358
R357
R361
IC351
4
1
5
8
C357
R355
C354
L351
D301
C359
C352
R353
C360
L352
Red
Black
1
8
1
3
1489
1508
AD
BC
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8 9 10 11 12

(Component View)

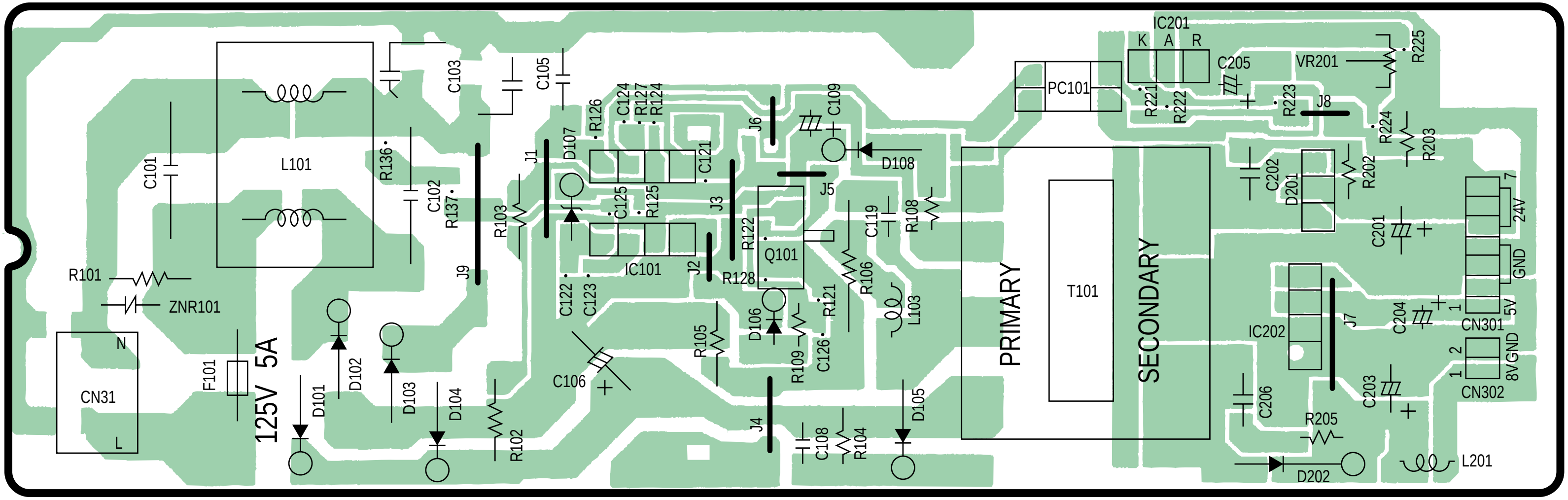

PFUP1336Z
C303
PbF
CN301
CN303
JJ309
SW303
CALLER-ID
JJ324
JJ301
JJ302
JJ303
JJ304
JJ305
JJ306
JJ323
JJ322
JJ310
LED302
CN302
1
JJ321
JJ311
JJ312
SW321
PRIVACY
(CALLER-IQ)
JJ319
SW323
HOLD
SW324
CONF
SW322
1
SW320
2
MAILBOX
SW325
3
JJ307
SW304
JJ308
LOCATOR/INTCOM
JJ320
JJ313
C351
SW326
GREET
(RECORD)
SW328
MEMO
(ERASE)
SW329
ERASE
(PLAY MESSAGES)
SW327
AUTO-ANSWER
LED301
PS301
JJ318
JJ317
JJ318
JJ314
JJ315
SW337
HELP
SW332
+
NAVIGATOR
SW334
−
SW335
◄
PREV
SW333
►
NEXT
SW331
MENU
SW330
SP-PHONE
SW301
COPY
SW302
FAX/START/SET
SW336
STOP
PCB-CH
A B C D E F G
a b c d
A B C 1 2 3 4 5 6 7 8 9 A B C
SW316
1
SW311
2
SW306
3
SW318
4
SW313
5
SW308
6
SW319
7
SW314
8
SW309
9
SW317
*
SW312
0
SW307
#
SW315
FLASH/CALL WAIT
SW310
REDIAL/PAUSE
SW305
MUTE

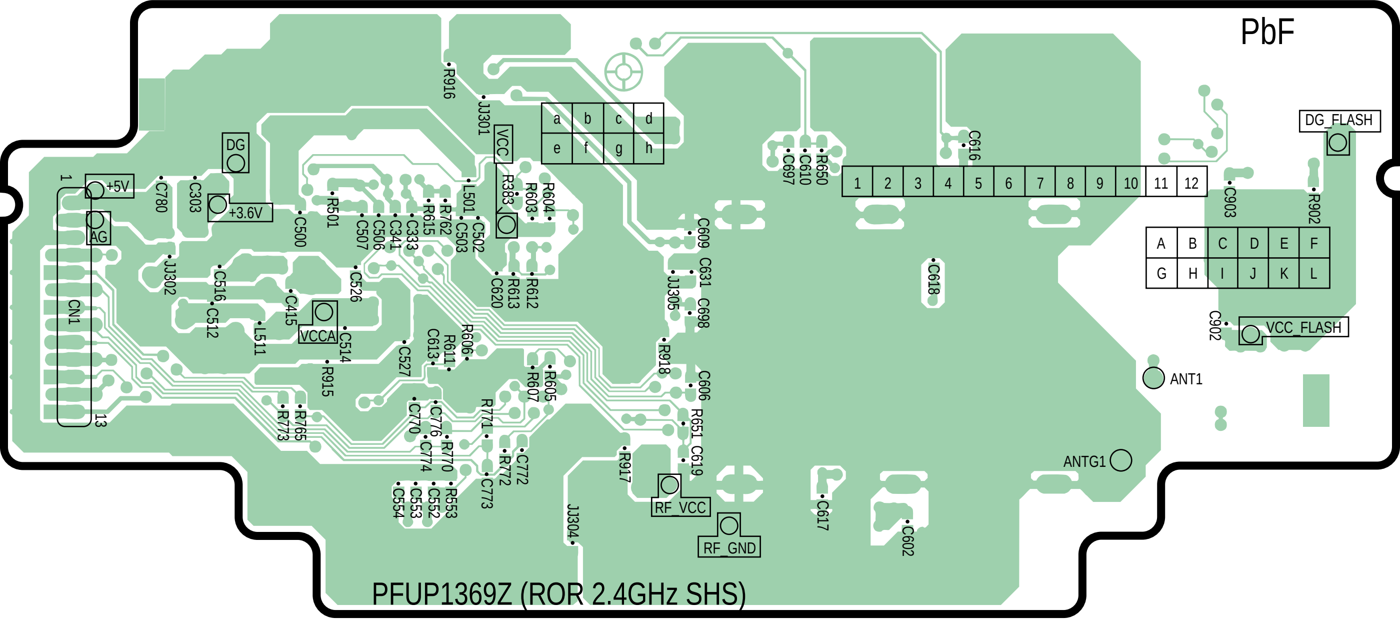
KX-FPG376/KX-FPG377 : OPERATION BOARD

(Component View)

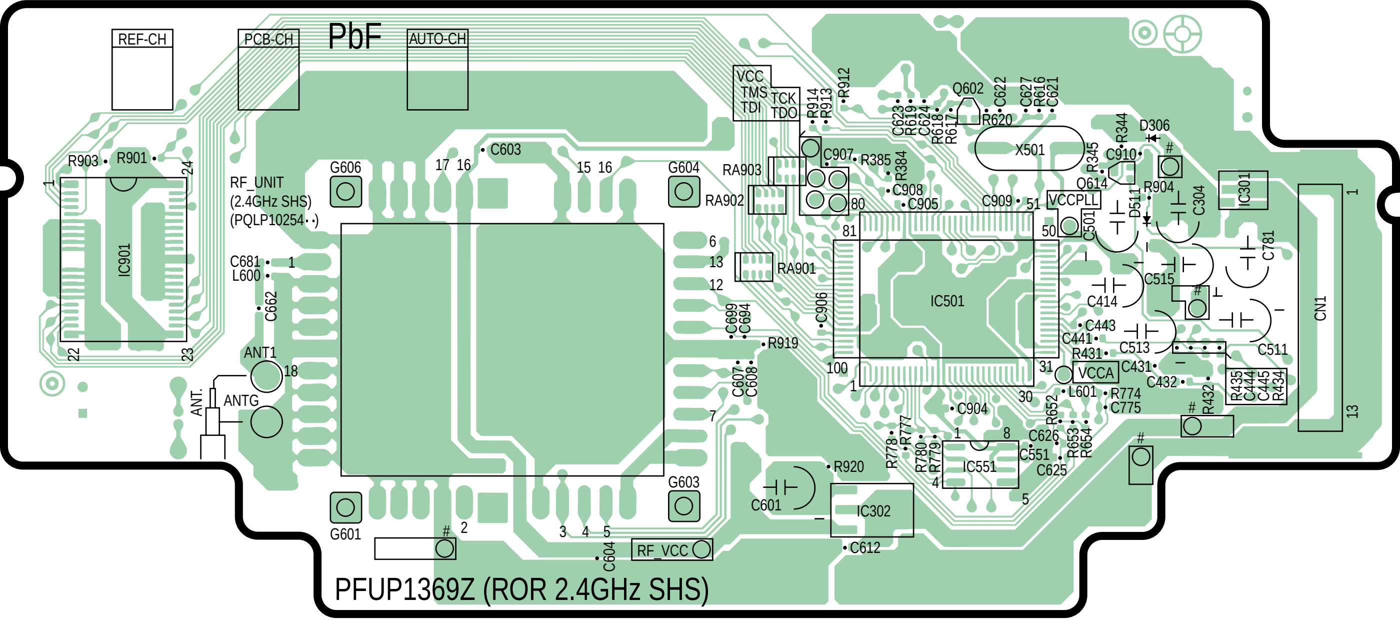

SRF1381UC
CN31
L
N
125V 5A
F101
ZNR101
R101
C101
L101
CAUTION
FOR CONTINUED
D101
D102
D103
D104
R102
C102
C103
J9
R103
J1
D107
C105
C106
IC101
1
R105
J4
J2
J3
D106
R109
Q101
S
D
G
R106
C108
R104
D105
L103
C119
R108
J5
D108
J6
C109
PROTECTION
AGAINST RISK OF FIRE. REPLACE
ONLY WITH SAME TYPE
AND RATINGS OF FUSE. (F101)
T101
PC101
IC201
K
R
A
C205
D202
L201
R205
C206
C203
IC202
J7
C204
CN302
CN301
C202
D201
C201
R203
R202
J8
VR201
1
2
7

(Bottom View)


IC201
K
A
R
PC101
C205
VR201
R225
R221
R222
R223
J8
R224
R203
L101
C101
C103
C105
R126
C124
R127
R124
J6
C109
D108
R136
C102
R137
R103
J1
D107
C121
C125
R125
J3
J5
C119
R108
R122
Q101
R128
J9
IC101
J2
C122
C123
R101
ZNR101
N
CN31
L
F101
125V 5A
D101
D102
D103
D104
R102
C106
R105
D106
R109
R121
C126
R106
L103
J4
C108
R104
D105
PRIMARY
T101
SECONDARY
C202
D201
R202
C201
24V
GND
7
IC202
J7
C204
5V
CN301
1
2
8V GND
C206
C203
CN302
R205
L201
D202

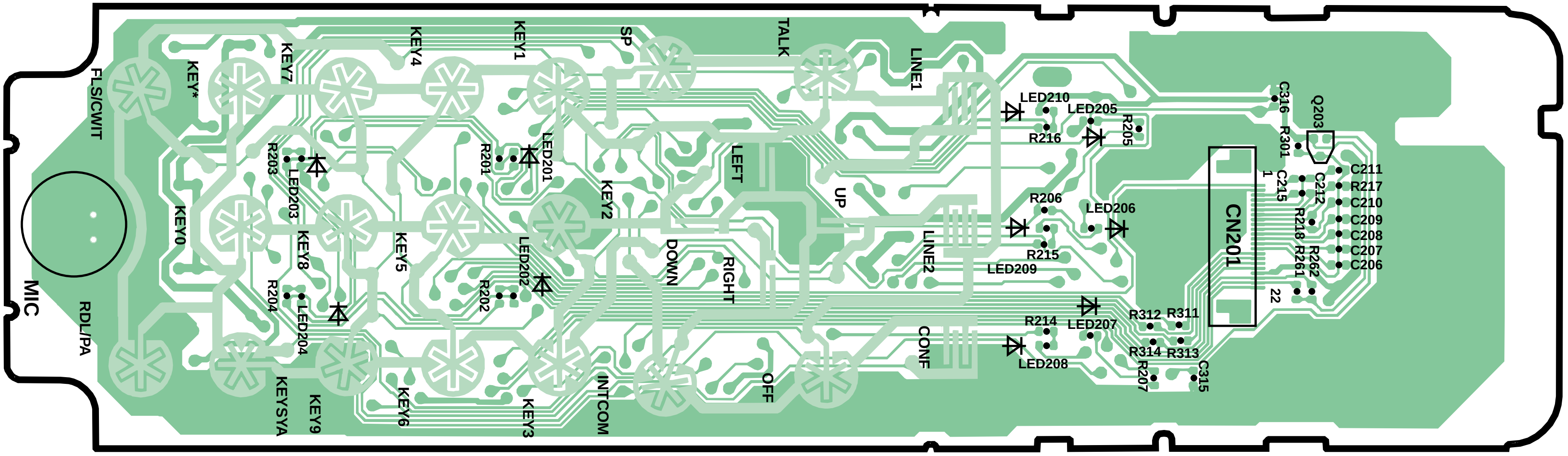

PbF
PFUP1369Z (ROR 2.4GHz SHS)
DG
AG
+5V
+3.6V
VCC
VCCA
DG_FLASH
VCC_FLASH
RF_VCC
RF_GND
ANT1
ANTG1
CN1
1
13
a
b
c
d
e
f
g
h
1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
I
J
K
L
C780
C303
JJ302
C516
C512
L511
C415
C500
R501
C507
C506
C341
C333
R615
R762
L501
C503
C502
R383
R603
R604
C620
R613
R612
C526
C514
R915
C527
C613
R611
R606
R607
R605
R916
JJ301
C609
C631
JJ305
C698
R918
C606
R651
C619
R917
JJ304
C697
C610
R650
C616
C618
C903
R902
C902
C617
C602
R773
R765
C770
C776
C774
R770
R771
R772
C772
C773
C554
C553
C552
R553

KX-FPG376/KX-FPG377 : CORDLESS BASE BOARD : BOTTOM VIEW

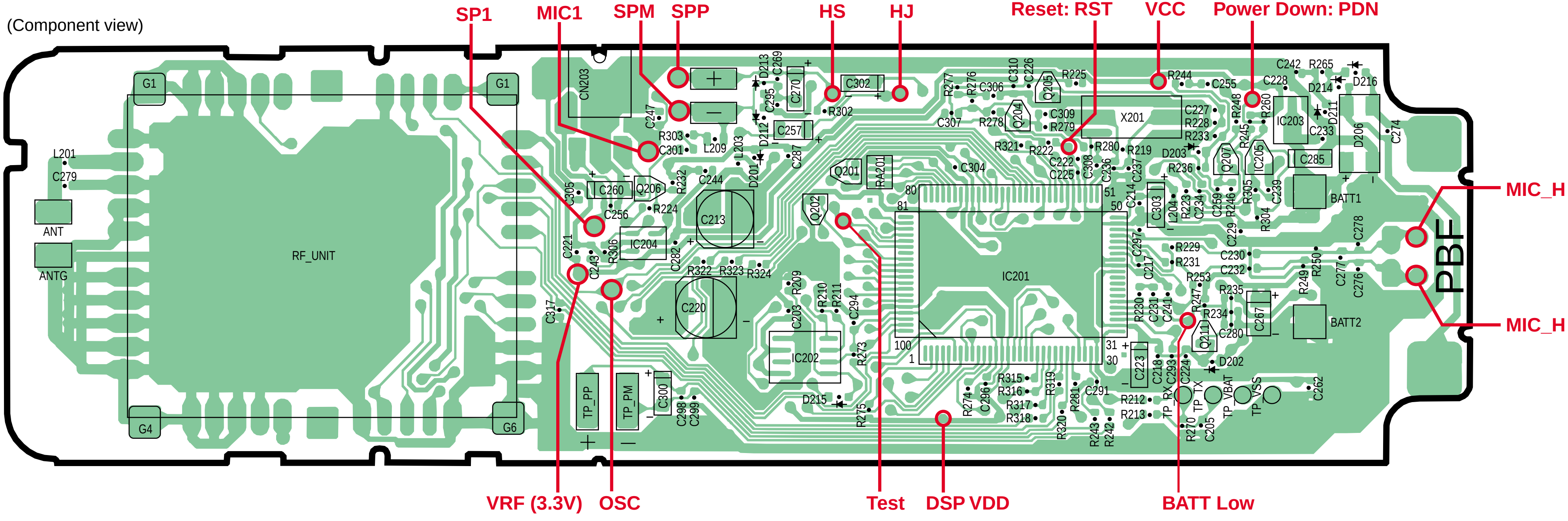

REF-CH
PCB-CH
PbF
AUTO-CH
VCC
TMS
TDI
TCK
TDO
R914
R913
R912
C623
R619
C624
R618
R617
Q602
R620
C622
C627
R616
C621
X501
R344
D306
R345
C910
#
Q614
R904
IC301
D511
C304
VCCPLL
1
R903
R901
24
1
IC901
22
23
RF_UNIT
(2.4GHz SHS)
(PQLP10254・・)
G606
17
16
C603
15
16
G604
RA903
C907
R385
R384
C908
C905
RA902
80
C909
51
50
81
C501
C781
C515
#
C414
C443
C441
C513
C511
R431
C431
C432
R435
C444
C445
R434
CN1
13
6
13
12
RA901
C906
IC501
C681
L600
1
C662
C699
C694
R919
ANT1
18
ANT.
ANTG
C607
C608
100
1
31
VCCA
30
L601
R774
C775
#
R432
R652
7
C904
R777
R778
R780
R779
1
8
C626
C551
R653
R654
C625
#
IC551
4
5
R920
C601
IC302
C612
G603
G601
#
2
3
4
5
C604
RF_VCC
PFUP1369Z (ROR 2.4GHz SHS)

KX-FPG376/KX-FPG377 : CORDLESS BASE BOARD : COMPONENT VIEW

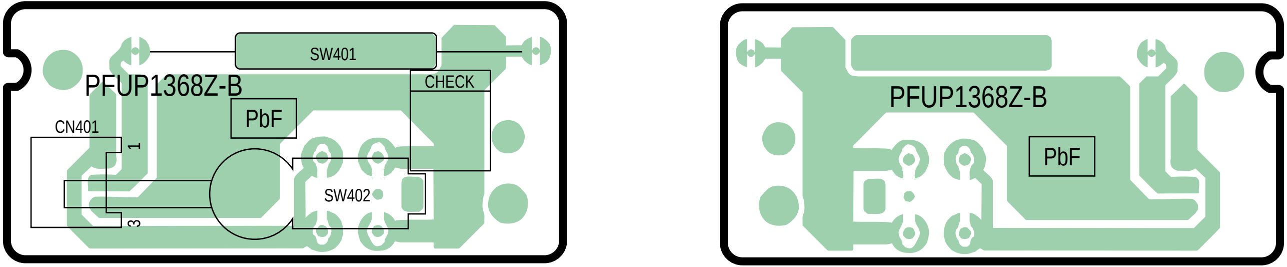
(Flow solder side view)


MIC
FLS/CWIT
RDL/PA
KEY*
KEY7
KEY4
KEY1
SP
TALK
LINE1
KEY0
KEY8
KEY5
KEY2
LEFT
UP
DOWN
RIGHT
LINE2
KEYSYA
KEY9
KEY6
KEY3
INTCOM
OFF
CONF
LED201
LED202
LED203
LED204
LED205
LED206
LED207
LED208
LED209
LED210
R201
R202
R203
R204
R205
R206
R207
R214
R215
R216
R218
R261
R262
R301
R311
R312
R313
R314
C206
C207
C208
C209
C210
C211
C212
C215
C315
C316
R217
Q203
CN201
1
22

(Component view)


SP1
MIC1
SPM
SPP
HS
HJ
Reset: RST
VCC
Power Down: PDN
MIC_H
MIC_H
VRF (3.3V)
OSC
Test
DSP VDD
BATT Low
RF_UNIT
G1
G1
G4
G6
ANT
ANTG
L201
C279
CN203
IC201
IC202
IC203
IC204
IC205
X201
C213
C220
C302
C257
C260
C270
BATT1
BATT2
TP_PP
TP_PM
TP_RX
TP_TX
TP_VBAT
TP_VSS
PbF
100
1
80
81
51
50
31
30

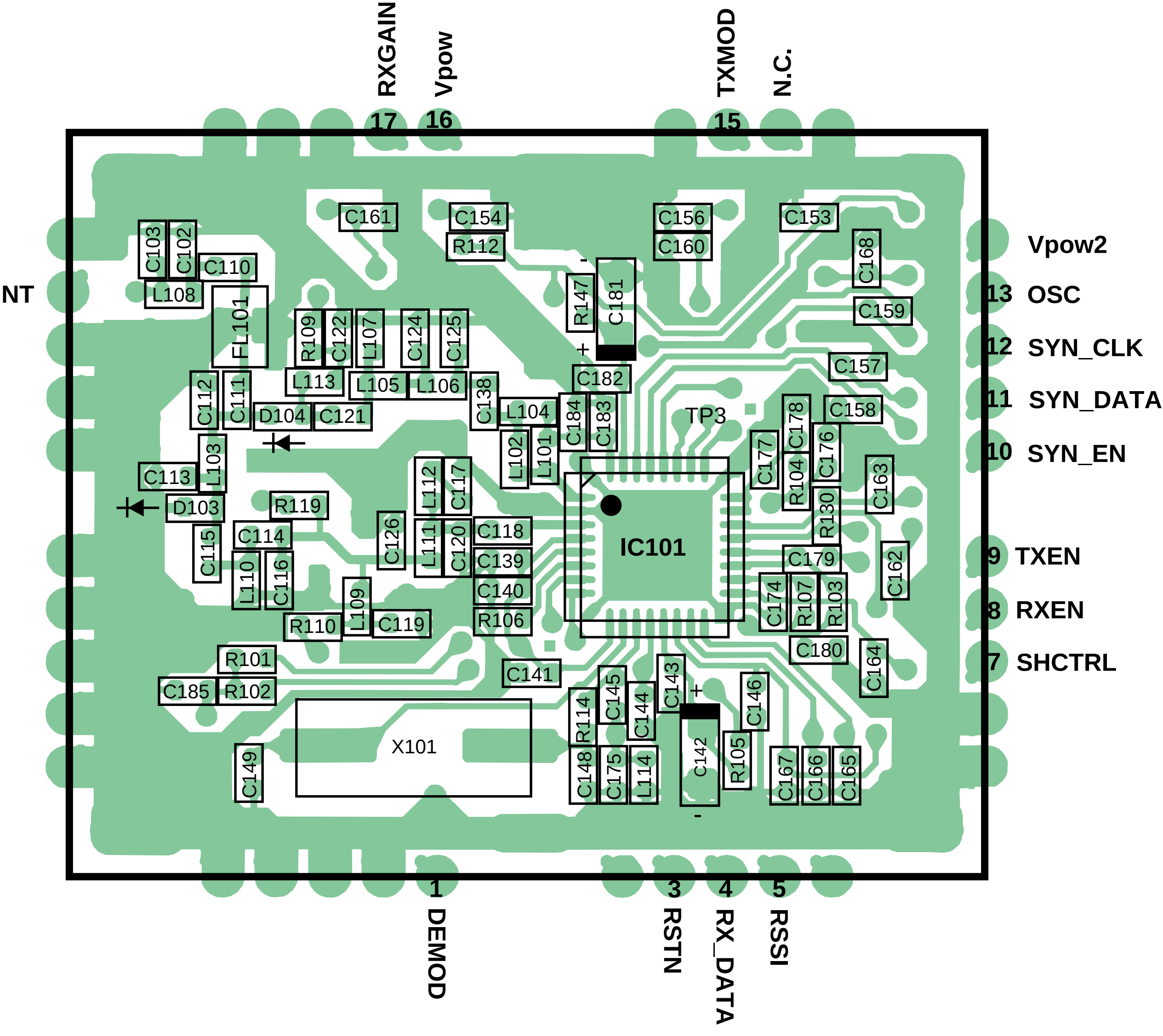
Note: The position of "**PbF**" marking sometimes may change.


SW401
PFUP1368Z-B
CHECK
PbF
CN401
1
3
SW402
PFUP1368Z-B
PbF

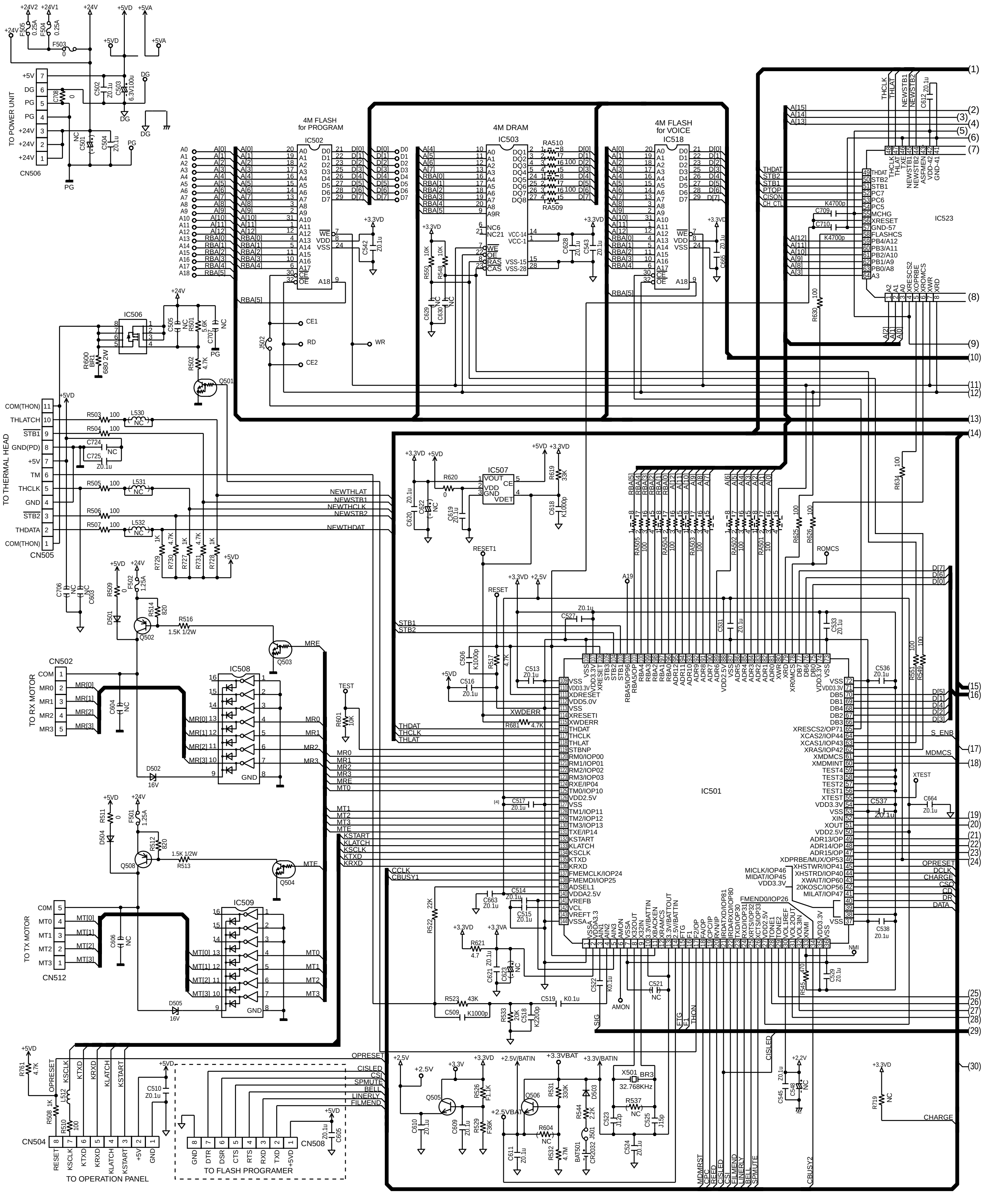
(Component View)

(Bottom View)

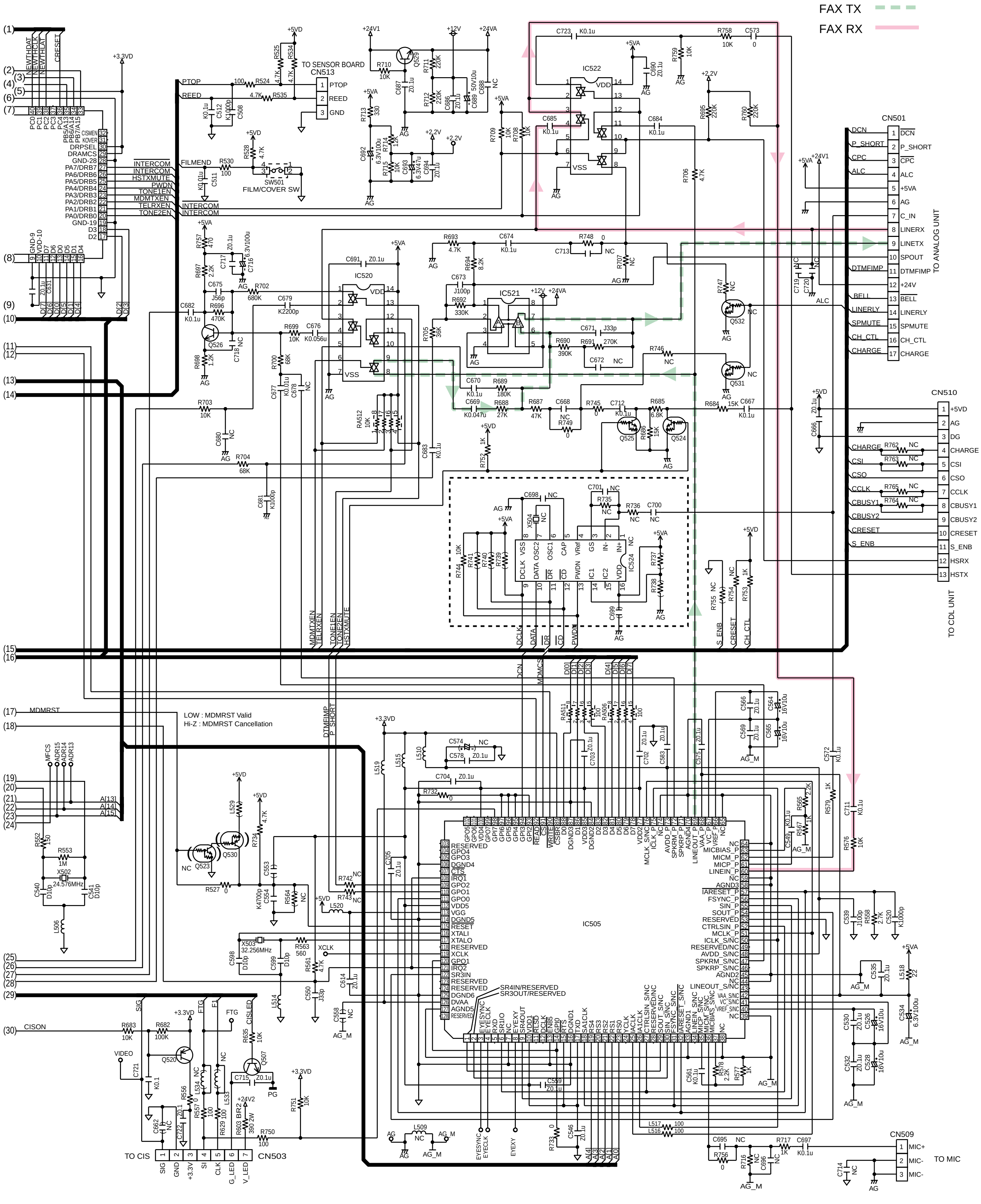
KX-FPG376/KX-FPG377 : SENSOR BOARD


RXGAIN
Vpow
TXMOD
N.C.
17
16
15
Vpow2
13 OSC
12 SYN_CLK
11 SYN_DATA
10 SYN_EN
9 TXEN
8 RXEN
7 SHCTRL
NT
1
DEMOD
3
RSTN
4
RX_DATA
5
RSSI
IC101
TP3
X101
FL101
C161
C154
R112
C156
C160
C153
C168
C159
C157
C158
R147
C181
C182
C103
C102
C110
L108
R109
C122
L107
C124
C125
L113
L105
L106
C138
L104
C184
C183
C112
C111
D104
C121
L102
L101
C177
C178
C176
R104
C163
R130
C113
L103
D103
R119
L112
C117
C114
C115
L110
C116
C126
L111
C120
C118
C139
C140
R106
L109
R110
C119
C179
C174
R107
R103
C162
C180
C164
R101
C185
R102
C141
C149
R114
C145
C144
C143
C146
C142
R105
C148
C175
L114
C167
C166
C165
+
-

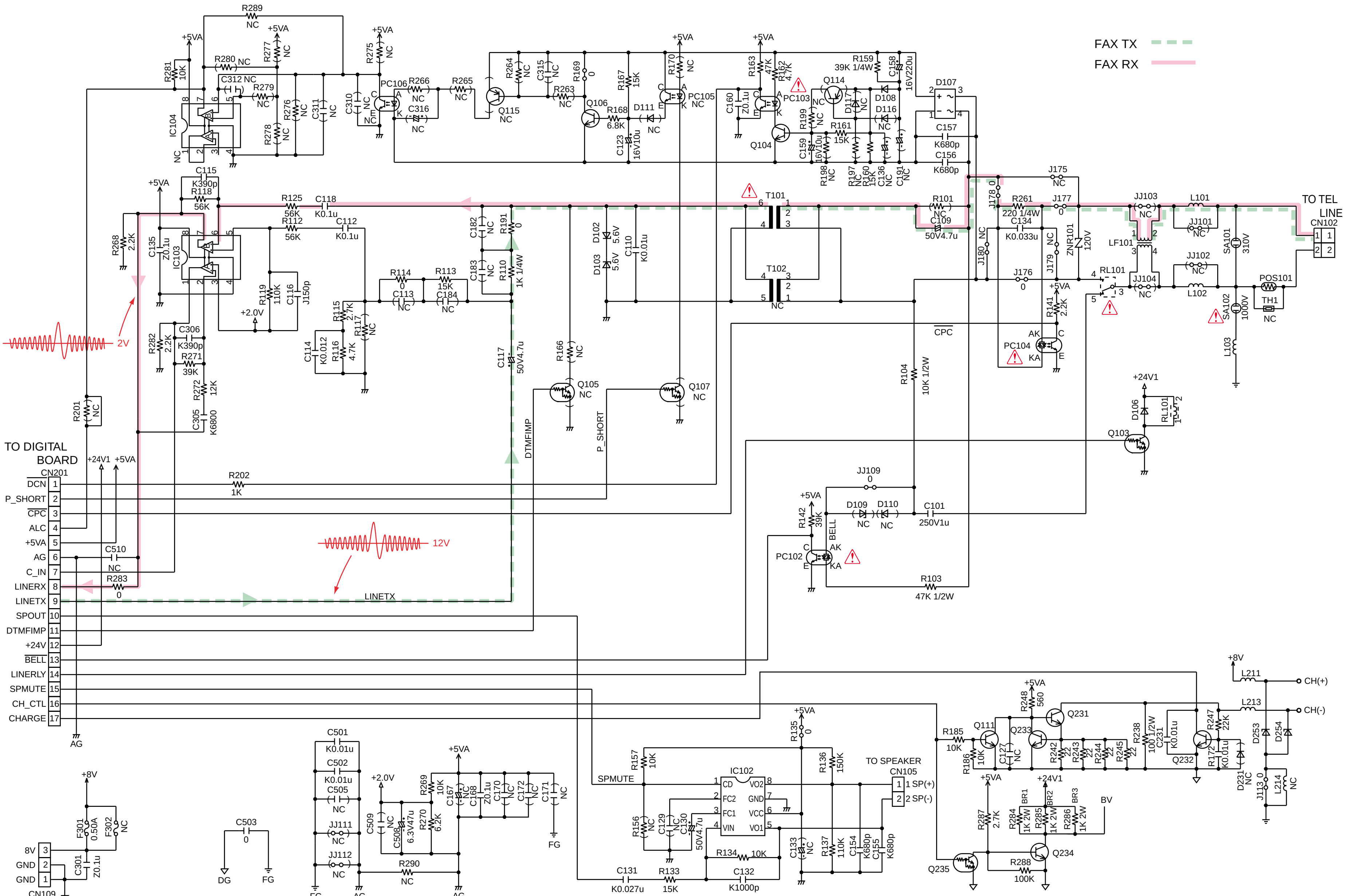
KX-FPG376/KX-FPG377 : RF UNIT



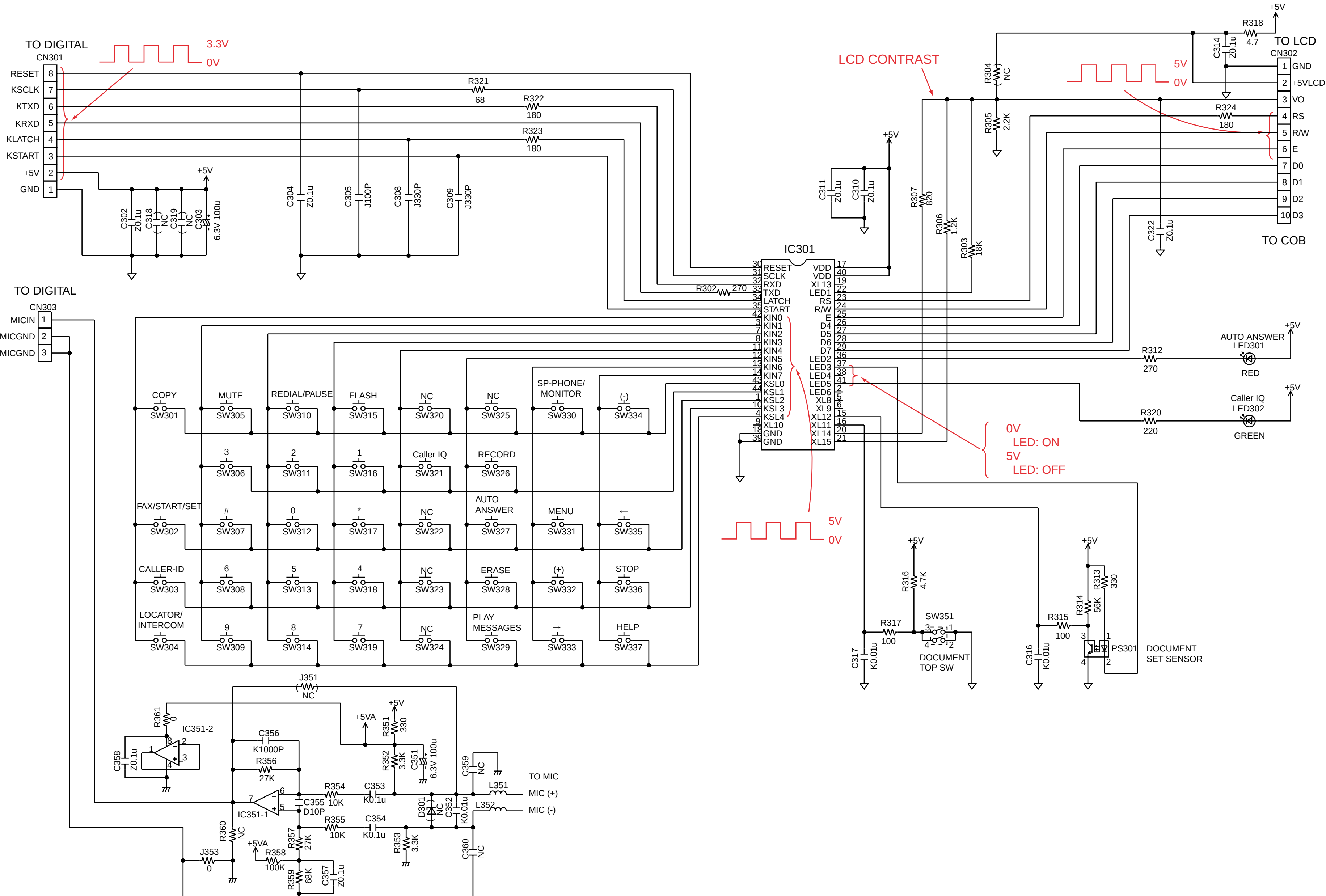
+24V2
+24V1
+24V
+5VD
+5VA
F505 0.25A
F504 0.25A
F503
TO POWER UNIT
CN506
+5V
DG
PG
+24V
C708
C501
C502 Z0.1u
C503 6.3V100u
C504 Z0.1u
4M FLASH for PROGRAM
IC502
4M DRAM
IC503
4M FLASH for VOICE
IC518
RA510
RA509
C542 Z0.1u
C628 Z0.1u
C543 Z0.1u
C665 Z0.1u
R550 10K
R548 10K
C629 NC
C630 NC
CE1
RD
CE2
WR
J502
IC506
R600 BR1 680 2W
R501 5.6K
C505 NC
C707 NC
R502 4.7K
Q501
IC523
THCLK
THLAT
TXE
NEWSTB1
NEWSTB2
ASFMEN
VDD-42
GND-41
C612 Z0.1u
K4700p
C709
C710
R630 100
(1)
(2)
(3)
(4)
(5)
(6)
(7)
(8)
(9)
(10)
(11)
(12)
(13)
(14)
(15)
(16)
(17)
(18)
(19)
(20)
(21)
(22)
(23)
(24)
(25)
(26)
(27)
(28)
(29)
(30)
TO THERMAL HEAD
CN505
COM(THON)
THLATCH
STB1
GND(PD)
+5V
TM
THCLK
GND
STB2
THDATA
R503 100
L530 NC
R504 100
C724 NC
C725 Z0.1u
R505 100
L531 NC
R506 100
R507 100
L532 NC
R729 1K
R730 4.7K
R727 1K
R731 4.7K
R728 1K
NEWTHLAT
NEWSTB1
NEWTHCLK
NEWSTB2
NEWTHDAT
C706 NC
C603 NC
IC507
VOUT
VDD
GND
VDET
CE
R620 0
C620 Z0.1u
C622 NC
C619 Z0.1u
R619 33K
C618 K1000p
RESET1
RESET
A19
ROMCS
R625 100
R626 100
R634 100
RA505
RA504
RA503
RA502
RA501
IC501
C527 Z0.1u
C531 Z0.1u
C533 Z0.1u
C536 Z0.1u
C506 K1000p
R517 4.7K
C513 Z0.1u
C516 Z0.1u
R681 4.7K
XWDERR
R551 100
R549 100
TO RX MOTOR
CN502
COM
MR0
MR1
MR2
MR3
R509 0
F502 1.25A
D501
R514 820
Q502
R516 1.5K 1/2W
Q503
MRE
IC508
C604 NC
D502 16V
TEST
R601 10K
STB1
STB2
THDAT
THCLK
THLAT
MT0
MT1
MT2
MT3
MTE
KSTART
KLATCH
KSCLK
KTXD
KRXD
CCLK
CBUSY1
S_ENB
MDMCS
XTEST
C664 Z0.1u
C537 Z0.1u
OPRESET
DCLK
CHARGE
CSD
CD
DR
DATA
MICLK/IOP46
MIDAT/IOP45
VDD3.3V
FMEND0/IOP26
C538 Z0.1u
NMI
TO TX MOTOR
CN512
R511 0
F501 1.25A
D504
R512 820
Q508
R513 1.5K 1/2W
Q504
IC509
C606 NC
D505 16V
C663 Z0.1u
C514 Z0.1u
C515 Z0.1u
C517 Z0.1u
R522 22K
R621 4.7
C621 Z0.1u
C623 NC
R523 43K
C509 K1000p
R533 20K
C518 K200p
C519 K0.1u
C522 K0.1u
AMON
C521 NC
SIG
FTG
THON
R570
R545
C529 Z0.1u
CISLED
C545 Z0.1u
C548 NC
+2.2V
R719 NC
CHARGE
CBUSY2
MDMRST
CPC
REED
CISLED
CS
FILMEND
LINERLY
BELL
SPMUTE
R761 4.7K
OPRESET
KSCLK
KRXD
KLATCH
KSTART
L512
R508 1K
R510 100
C510 Z0.1u
CN504
RESET
KTXD
GND
TO OPERATION PANEL
CN508
DTR
DSR
CTS
RTS
RXD
TXD
C605 NC
TO FLASH PROGRAMER
+2.5V
Q505
R526 F1.1K
C610 Z0.1u
C609 Z0.1u
R529 F36K
+2.5V/BATIN
+2.5VBAT
Q506
R531 330K
D503
+3.3VBAT
+3.3V/BATIN
R544 2.2K
J501
C611 Z0.1u
R604 NC
R532 4.7M
BAT501 CR2032
X501 BR3 32.768KHz
R537 NC
C523 J12p
C525 J15p
C524 Z0.1u


FAX TX
FAX RX
TO SENSOR BOARD
CN513
PTOP
REED
GND
SW501
FILM/COVER SW
IC522
IC520
IC521
IC524
IC505
CN501
DCN
P_SHORT
CPC
ALC
+5VA
AG
C_IN
LINERX
LINETX
SPOUT
DTMFIMP
+24V
BELL
LINERLY
SPMUTE
CH_CTL
CHARGE
TO ANALOG UNIT
CN510
+5VD
DG
CSI
CSO
CCLK
CBUSY1
CBUSY2
CRESET
S_ENB
HSRX
HSTX
TO CDL UNIT
LOW : MDMRST Valid
Hi-Z : MDMRST Cancellation
MDMRST
X502
24.576MHz
X503
32.256MHz
CN503
TO CIS
SIG
GND
+3.3V
SI
CLK
G_LED
V_LED
CISON
VIDEO
FTG
PG
CN509
MIC+
MIC-
TO MIC
SR4IN/RESERVED
SR3OUT/RESERVED
EYESYNC
EYECLK
EYEXY

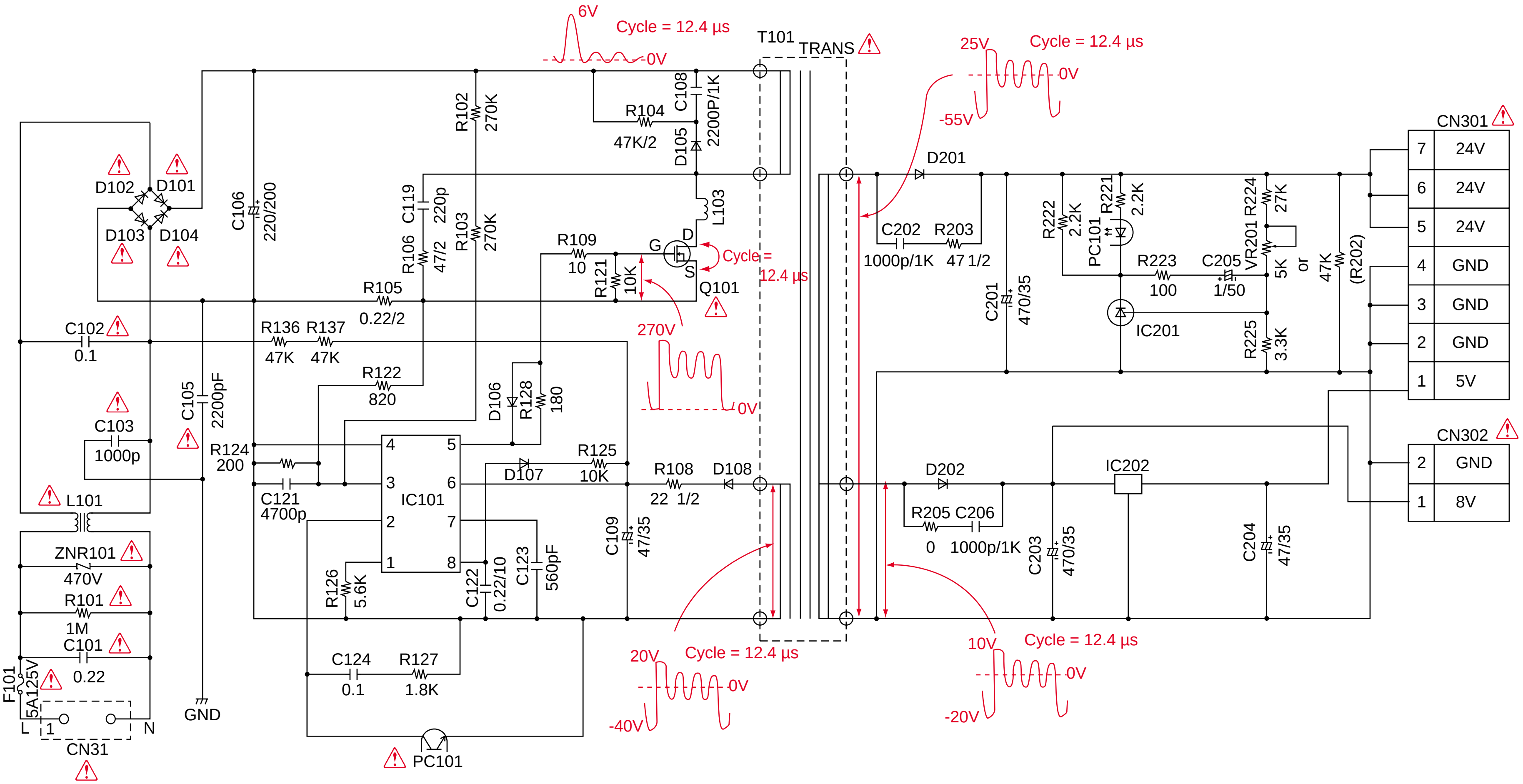
KX-FPG376/KX-FPG377 : DIGITAL BOARD SCHEMATIC DIAGRAM


FAX TX
FAX RX
TO TEL LINE
CN102
TO DIGITAL BOARD
CN201
DCN
P_SHORT
CPC
ALC
+5VA
AG
C_IN
LINERX
LINETX
SPOUT
DTMFIMP
+24V
BELL
LINERLY
SPMUTE
CH_CTL
CHARGE
2V
12V
LINETX
DTMFIMP
P_SHORT
CPC
BELL
SPMUTE
IC104
IC103
IC102
T101
T102
PC106
PC105
PC103
PC104
PC102
Q115
Q106
Q114
Q104
Q105
Q107
Q103
Q111
Q231
Q233
Q232
Q234
Q235
D107
RL101
LF101
ZNR101
SA101
SA102
POS101
TH1
L101
L102
L103
L211
L213
L214
CH(+)
CH(-)
TO SPEAKER
CN105
SP(+)
SP(-)
+8V
F301
0.50A
F302
NC
CN109
8V
GND
GND
DG
FG
+24V1
BR1
BR2
BR3
BV

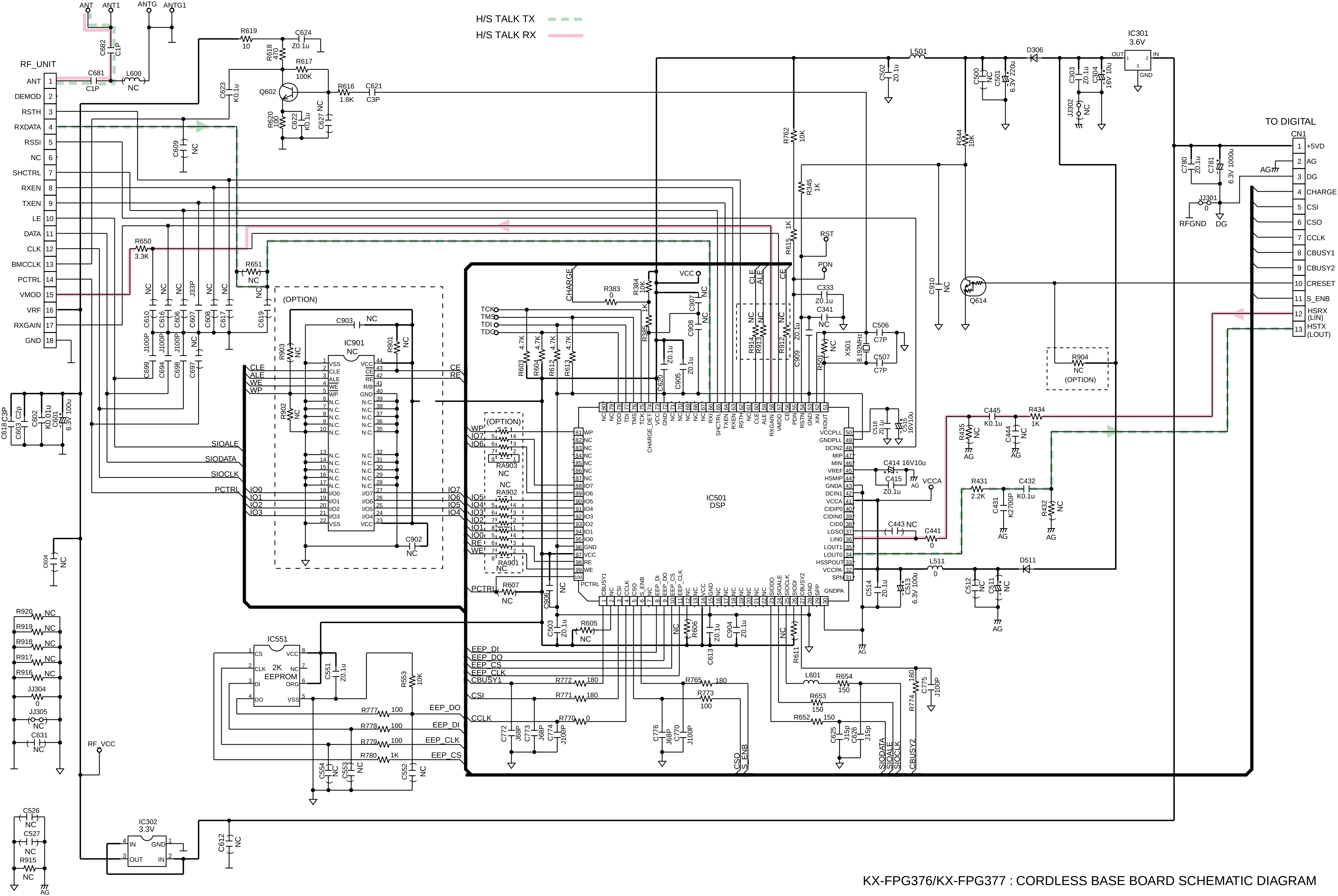
KX-FPG376 / KX-FPG377 : ANALOG BOARD SCHEMATIC DIAGRAM


TO DIGITAL
CN301
3.3V
0V
RESET 8
KSCLK 7
KTXD 6
KRXD 5
KLATCH 4
KSTART 3
+5V 2
GND 1
+5V
C302 Z0.1u
C318 NC
C319 NC
C303 6.3V 100u
C304 Z0.1u
C305 J100P
C308 J330P
C309 J330P
R321 68
R322 180
R323 180
LCD CONTRAST
R304 NC
R305 2.2K
R318 4.7
+5V
C314 Z0.1u
TO LCD
CN302
5V
0V
1 GND
2 +5VLCD
3 VO
4 RS
5 R/W
6 E
7 D0
8 D1
9 D2
10 D3
R324 180
TO COB
C322 Z0.1u
+5V
C311 Z0.1u
C310 Z0.1u
R307 820
R306 1.2K
R303 18K
IC301
30 RESET
31 SCLK
32 RXD
33 TXD
34 LATCH
35 START
42 KIN0
3 KIN1
7 KIN2
8 KIN3
11 KIN4
12 KIN5
13 KIN6
14 KIN7
43 KSL0
44 KSL1
1 KSL2
10 KSL3
4 KSL4
9 XL10
18 GND
39 GND
VDD 17
VDD 40
XL13 19
LED1 22
RS 23
R/W 24
E 25
D4 26
D5 27
D6 28
D7 29
LED2 36
LED3 37
LED4 38
LED5 41
LED6 2
XL8 5
XL9 6
XL12 15
XL11 16
XL14 20
XL15 21
R302 270
TO DIGITAL
CN303
MICIN 1
MICGND 2
MICGND 3
COPY SW301
MUTE SW305
REDIAL/PAUSE SW310
FLASH SW315
NC SW320
NC SW325
SP-PHONE/ MONITOR SW330
(-) SW334
3 SW306
2 SW311
1 SW316
Caller IQ SW321
RECORD SW326
FAX/START/SET SW302
# SW307
0 SW312
* SW317
NC SW322
AUTO ANSWER SW327
MENU SW331
← SW335
CALLER-ID SW303
6 SW308
5 SW313
4 SW318
NC SW323
ERASE SW328
(+) SW332
STOP SW336
LOCATOR/ INTERCOM SW304
9 SW309
8 SW314
7 SW319
NC SW324
PLAY MESSAGES SW329
→ SW333
HELP SW337
+5V
AUTO ANSWER LED301
R312 270
RED
+5V
Caller IQ LED302
R320 220
GREEN
0V LED: ON
5V LED: OFF
5V
0V
+5V
R316 4.7K
R317 100
SW351
C317 K0.01u
DOCUMENT TOP SW
+5V
R313 330
R314 56K
R315 100
C316 K0.01u
PS301
DOCUMENT SET SENSOR
J351 NC
R361 0
IC351-2
C358 Z0.1u
C356 K1000P
R356 27K
+5V
+5VA
R351 330
R352 3.3K
C351 6.3V 100u
C359 NC
TO MIC
MIC (+)
MIC (-)
L351
L352
R354 10K
C353 K0.1u
C355 D10P
IC351-1
D301 NC
C352 K0.01u
R355 10K
C354 K0.1u
R353 3.3K
R360 NC
R357 27K
C360 NC
J353 0
+5VA
R358 100K
R359 68K
C357 Z0.1u

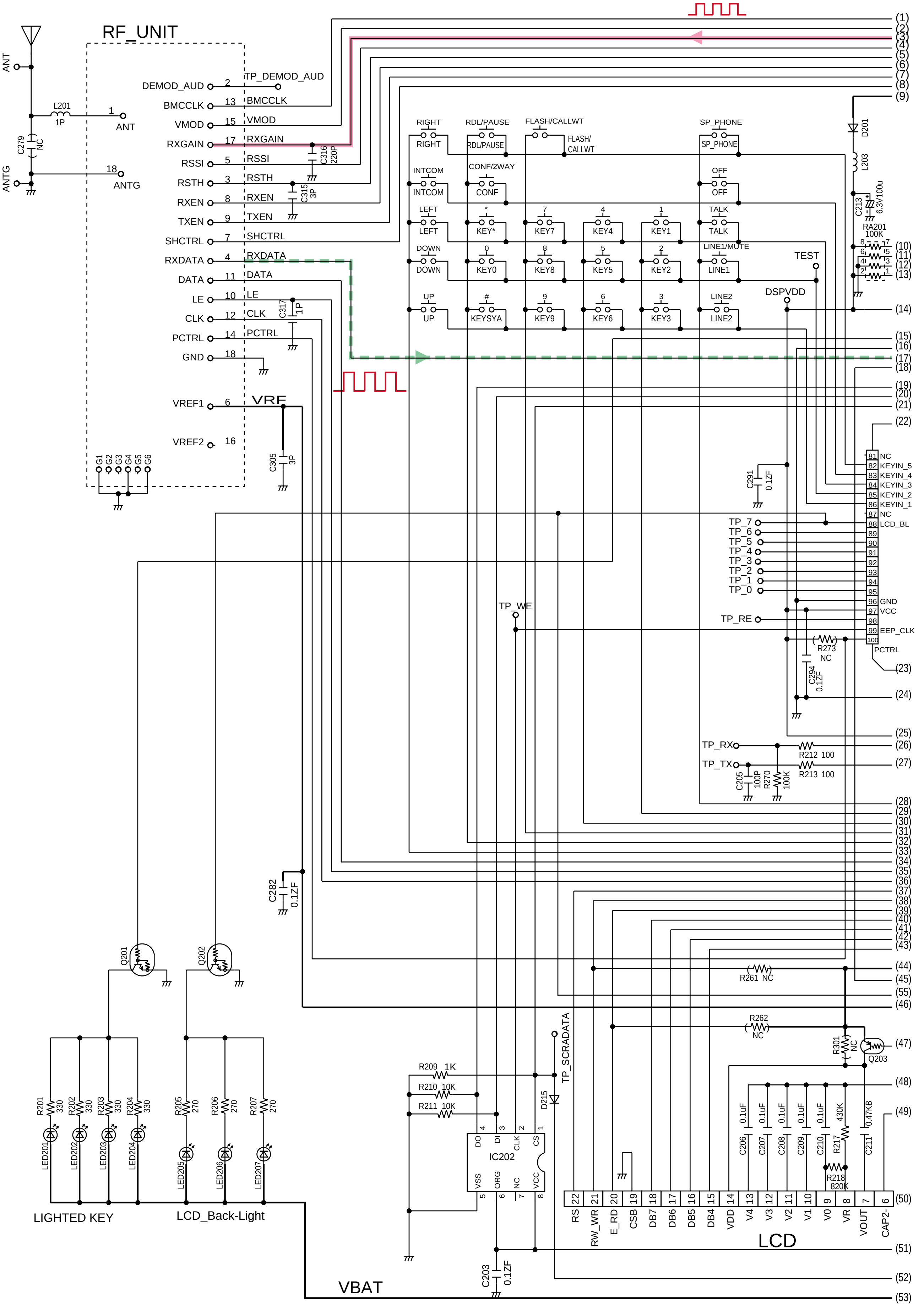
KX-FPG376 / KX-FPG377 : OPERATION BOARD SCHEMATIC DIAGRAM

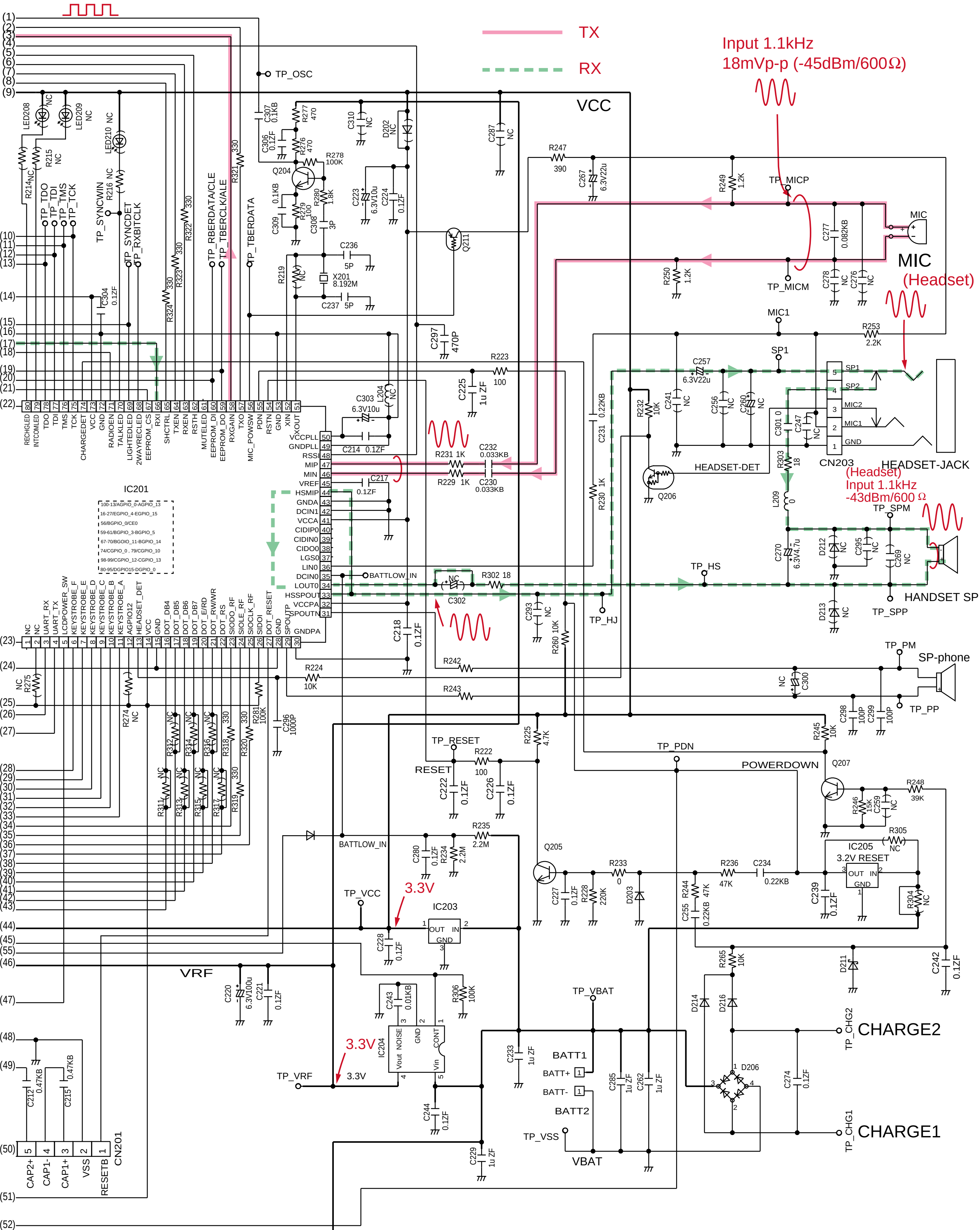

6V
Cycle = 12.4 µs
0V
T101
TRANS
25V
Cycle = 12.4 µs
0V
-55V
CN301
7
24V
6
24V
5
24V
4
GND
3
GND
2
GND
1
5V
CN302
2
GND
1
8V
R102
270K
R104
47K/2
C108
2200P/1K
D105
L103
C106
220/200
C119
220p
R106
47/2
R103
270K
D102
D101
D103
D104
R109
10
G
D
S
Q101
R121
10K
Cycle =
12.4 µs
270V
0V
R105
0.22/2
C102
0.1
R136
47K
R137
47K
R122
820
C103
1000p
C105
2200pF
R124
200
D106
R128
180
R125
10K
IC101
4
5
3
6
2
7
1
8
C121
4700p
D107
R108
22 1/2
D108
C109
47/35
L101
ZNR101
470V
R101
1M
C101
0.22
F101
5A125V
L
1
N
CN31
GND
R126
5.6K
C122
0.22/10
C123
560pF
C124
0.1
R127
1.8K
PC101
20V
Cycle = 12.4 µs
0V
-40V
D201
C202
1000p/1K
R203
47 1/2
C201
470/35
R222
2.2K
PC101
R221
2.2K
R223
100
C205
1/50
R224
27K
VR201
5K
or
47K
(R202)
IC201
R225
3.3K
D202
R205
0
C206
1000p/1K
C203
470/35
IC202
C204
47/35
10V
Cycle = 12.4 µs
0V
-20V

KX-FPG376 / KX-FPG377 : POWER SUPPLY BOARD SCHEMATIC DIAGRAM


H/S TALK TX
H/S TALK RX
ANT
ANT1
ANTG
ANTG1
RF_UNIT
ANT 1
DEMOD 2
RSTH 3
RXDATA 4
RSSI 5
NC 6
SHCTRL 7
RXEN 8
TXEN 9
LE 10
DATA 11
CLK 12
BMCCLK 13
PCTRL 14
VMOD 15
VRF 16
RXGAIN 17
GND 18
C682 C1P
C681 C1P
L600 NC
R619 10
C624 Z0.1u
R618 470
R617 100K
Q602
C623 K0.1u
R616 1.8K
C621 C3P
R620 100
C622 K0.1u
C627 NC
C609 NC
R650 3.3K
R651 NC
C610 J100P
C616 J100P
C606 J100P
C607 J33P
C608 NC
C617 NC
C619 NC
C699
C694
C698
C697 NC
C618 C3P
C603 C2p
C602 K0.01u
C601 6.3V 100u
C604 NC
(OPTION)
C903 NC
IC901 NC
R903 NC
R901 NC
R902 NC
C902 NC
CLE
ALE
WE
WP
CE
RE
SIOALE
SIODATA
SIOCLK
PCTRL
IO0
IO1
IO2
IO3
IO4
IO5
IO6
IO7
VSS
R/B
GND
N.C.
I/O0
I/O1
I/O2
I/O3
I/O4
I/O5
I/O6
I/O7
VCC
RA903 NC
RA902 NC
RA901 NC
R607 NC
IC501 DSP
CHARGE
R383 0
R384 10K
R385 1K
VCC
C907 NC
C908 NC
C620 Z0.1u
C905 Z0.1u
TCK
TMS
TDI
TDO
R603 4.7K
R604 4.7K
R612 4.7K
R613 4.7K
CLE
ALE
CE
R914 NC
R913 NC
R912 NC
C909 Z0.1u
RST
PDN
C333 Z0.1u
C341 NC
R501 NC
X501 8.192MHz
C506 C7P
C507 C7P
R762 10K
R345 1K
R615 1K
L501
C502 Z0.1u
C500 NC
C501 6.3V 220u
D306
IC301 3.6V
OUT
IN
GND
C303 Z0.1u
C304 16V 10u
JJ302 NC
R344 10K
C910 NC
Q614
TO DIGITAL
CN1
1 +5VD
2 AG
3 DG
4 CHARGE
5 CSI
6 CSO
7 CCLK
8 CBUSY1
9 CBUSY2
10 CRESET
11 S_ENB
12 HSRX (LIN)
13 HSTX (LOUT)
C780 Z0.1u
C781 6.3V 1000u
JJ301 0
RFGND
DG
AG
R904 NC (OPTION)
C516 Z0.1u
C515 16V10u
C414 16V10u
C415 Z0.1u
VCCA
C443 NC
C441 0
R435 NC
C445 K0.1u
R434 1K
C444 NC
R431 2.2K
C432 K0.1u
C431 K2700P
R432 NC
L511 0
D511
C514 Z0.1u
C513 6.3V 100u
C512 NC
C511 NC
VCCPLL
GNDPLL
DCIN2
MIP
MIN
VREF
HSMIP
GNDA
DCIN1
VCCA
CIDIP0
CIDIN0
CID0
LGSO
LIN0
LOUT1
LOUT0
HSSPOUT
VCCPA
SPN
GNDPA
CBUSY1
CSI
CCLK
CSO
S_ENB
EEP_DI
EEP_DO
EEP_CS
EEP_CLK
SIODO
SIOALE
SIOCLK
SIODI
CBUSY2
SPP
C906 NC
C503 Z0.1u
R605 NC
R606 NC
C613 Z0.1u
C904 Z0.1u
R611 NC
IC551
2K EEPROM
CS
CLK
DI
DO
VCC
NC
ORG
VSS
C551 Z0.1u
R553 10K
R777 100
R778 100
R779 100
R780 1K
C554 NC
C553 NC
C552 NC
EEP_DO
EEP_DI
EEP_CLK
EEP_CS
R772 180
R771 180
R770 0
R765 180
R773 100
C772 J68P
C773 J68P
C774 J100P
C776 J68P
C770 J100P
L601
R654 150
R653 150
R652 150
C625 J15p
C626 J15p
R774 180
C775 J100P
CSO
S_ENB
SIODATA
SIOALE
SIOCLK
CBUSY2
R920 NC
R919 NC
R918 NC
R917 NC
R916 NC
JJ304 0
JJ305 NC
C631 NC
RF_VCC
C526 NC
C527 NC
R915 NC
IC302 3.3V
IN
OUT
GND
C612 NC

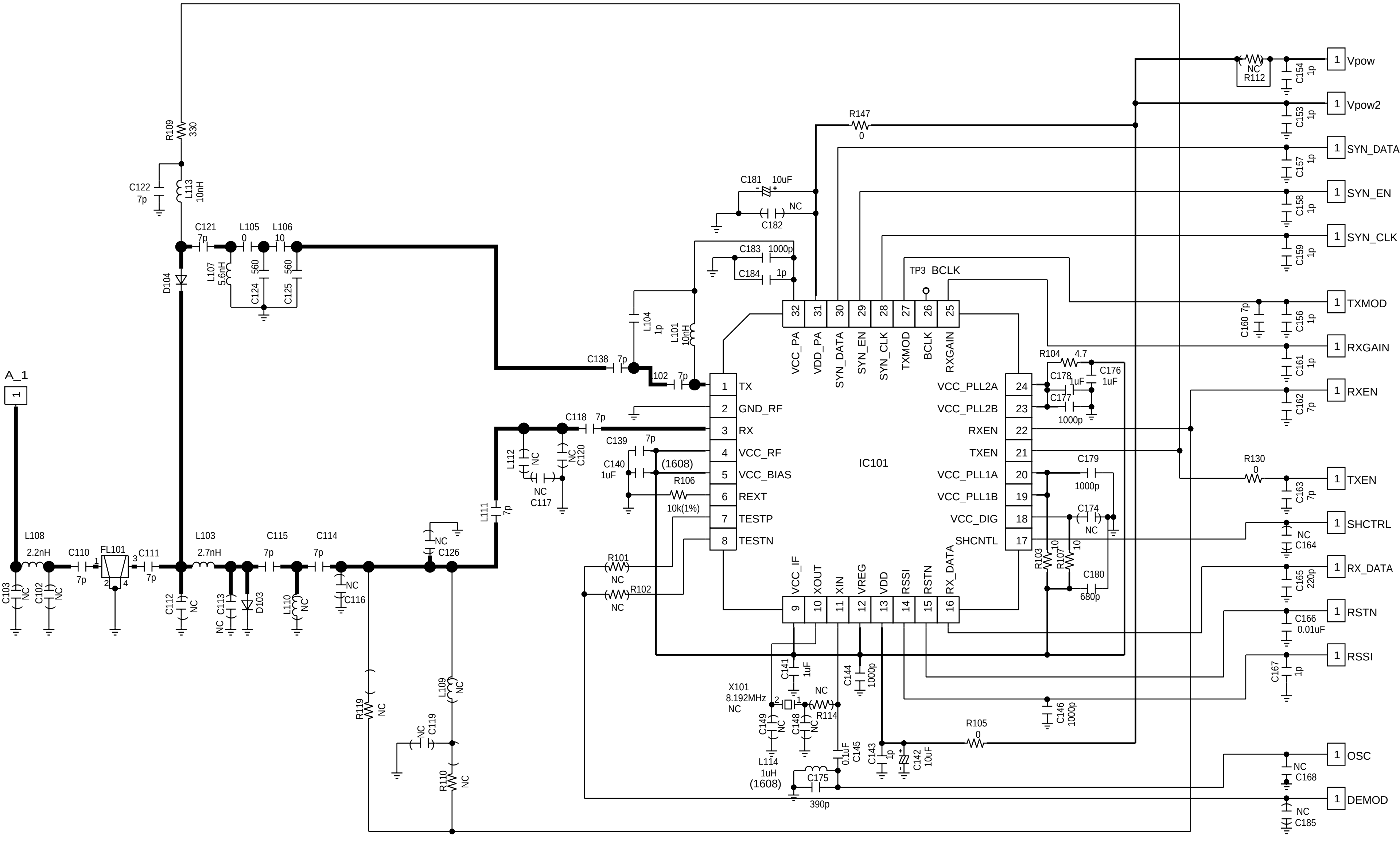
KX-FPG376/KX-FPG377 : CORDLESS BASE BOARD SCHEMATIC DIAGRAM


RF_UNIT
ANT
ANTG
L201
1P
C279
NC
1
ANT
18
ANTG
DEMOD_AUD 2 TP_DEMOD_AUD
BMCCLK 13 BMCCLK
VMOD 15 VMOD
RXGAIN 17 RXGAIN
RSSI 5 RSSI
RSTH 3 RSTH
RXEN 8 RXEN
TXEN 9 TXEN
SHCTRL 7 SHCTRL
RXDATA 4 RXDATA
DATA 11 DATA
LE 10 LE
CLK 12 CLK
PCTRL 14 PCTRL
GND 18
VREF1 6 VRF
VREF2 16
G1 G2 G3 G4 G5 G6
C316 220P
C315 3P
C317 1P
C305 3P
C282 0.1ZF
RIGHT
RDL/PAUSE
FLASH/CALLWT
FLASH/ CALLWT
SP_PHONE
INTCOM
CONF/2WAY
CONF
OFF
LEFT
*
KEY*
7
KEY7
4
KEY4
1
KEY1
TALK
DOWN
0
KEY0
8
KEY8
5
KEY5
2
KEY2
LINE1/MUTE
LINE1
TEST
UP
#
KEYSYA
9
KEY9
6
KEY6
3
KEY3
LINE2
DSPVDD
D201
L203
C213 6.3V/100u
RA201 100K
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22)
81 NC
82 KEYIN_5
83 KEYIN_4
84 KEYIN_3
85 KEYIN_2
86 KEYIN_1
87 NC
88 LCD_BL
89 90 91 92 93 94 95
96 GND
97 VCC
98
99 EEP_CLK
100 PCTRL
C291 0.1ZF
TP_7 TP_6 TP_5 TP_4 TP_3 TP_2 TP_1 TP_0
TP_WE
TP_RE
R273 NC
C294 0.1ZF
(23) (24) (25) (26) (27)
TP_RX
TP_TX
R212 100
R213 100
C205 100P
R270 100K
(28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (55) (46) (47) (48) (49) (50) (51) (52) (53)
R261 NC
R262 NC
R301 NC
Q203
Q201
Q202
R201 330
R202 330
R203 330
R204 330
R205 270
R206 270
R207 270
LED201 LED202 LED203 LED204 LED205 LED206 LED207
LIGHTED KEY
LCD_Back-Light
VBAT
R209 1K
R210 10K
R211 10K
TP_SCRADATA
D215
IC202
4 DO 3 DI 2 CLK 1 CS
5 VSS 6 ORG 7 NC 8 VCC
C203 0.1ZF
C206 0.1uF
C207 0.1uF
C208 0.1uF
C209 0.1uF
C210 0.1uF
R217 430K
C211 0.47KB
R218 820K
RS 22
RW_WR 21
E_RD 20
CSB 19
DB7 18
DB6 17
DB5 16
DB4 15
VDD 14
V4 13
V3 12
V2 11
V1 10
V0 9
VR 8
VOUT 7
CAP2- 6
LCD


TX
RX
Input 1.1kHz
18mVp-p (-45dBm/600Ω)
VCC
TP_OSC
MIC
MIC
(Headset)
TP_MICP
TP_MICM
MIC1
SP1
CN203
HEADSET-JACK
HEADSET-DET
(Headset)
Input 1.1kHz
-43dBm/600 Ω
TP_SPM
TP_SPP
TP_HS
TP_HJ
HANDSET SP
TP_PM
TP_PP
SP-phone
IC201
VCCPLL
GNDPLL
RSSI
MIP
MIN
VREF
HSMIP
GNDA
DCIN1
VCCA
CIDIP0
CIDIN0
CIDO0
LGS0
LIN0
DCIN0
LOUT0
HSSPOUT
VCCPA
SPOUTN
SPOUTP
GNDPA
BATTLOW_IN
TP_RESET
RESET
TP_PDN
POWERDOWN
IC205
3.2V RESET
OUT IN
GND
TP_VCC
3.3V
IC203
VRF
TP_VRF
3.3V
IC204
Vout NOISE GND CONT Vin
TP_VBAT
BATT1
BATT+
BATT-
BATT2
TP_VSS
VBAT
CHARGE2
CHARGE1
TP_CHG2
TP_CHG1
D206
CN201
CAP2+
CAP1-
CAP1+
VSS
RESETB
Q204
Q205
Q206
Q207
Q211
X201 8.192M
LED208
LED209
LED210
TP_TDO
TP_TDI
TP_TMS
TP_TCK
TP_SYNCWIN
TP_SYNCDET
TP_RXBITCLK
TP_RBERDATA/CLE
TP_TBERCLK/ALE
TP_TBERDATA
(1)
(2)
(3)
(4)
(5)
(6)
(7)
(8)
(9)
(10)
(11)
(12)
(13)
(14)
(15)
(16)
(17)
(18)
(19)
(20)
(21)
(22)
(23)
(24)
(25)
(26)
(27)
(28)
(29)
(30)
(31)
(32)
(33)
(34)
(35)
(36)
(37)
(38)
(39)
(40)
(41)
(42)
(43)
(44)
(45)
(55)
(46)
(47)
(48)
(49)
(50)
(51)
(52)
(53)

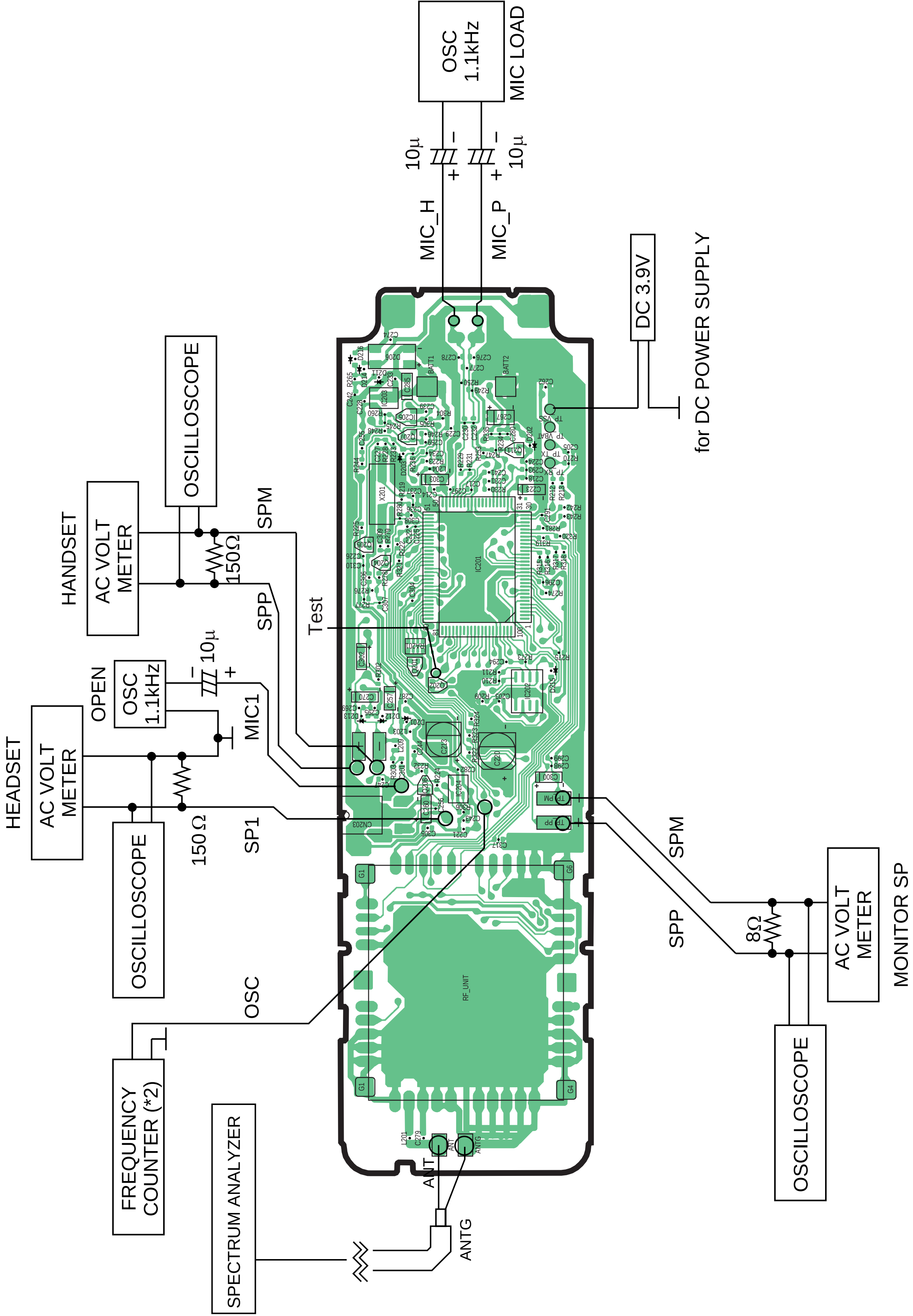
KX-FPG376/KX-FPG377 : HANDSET BOARD SCHEMATIC DIAGRAM

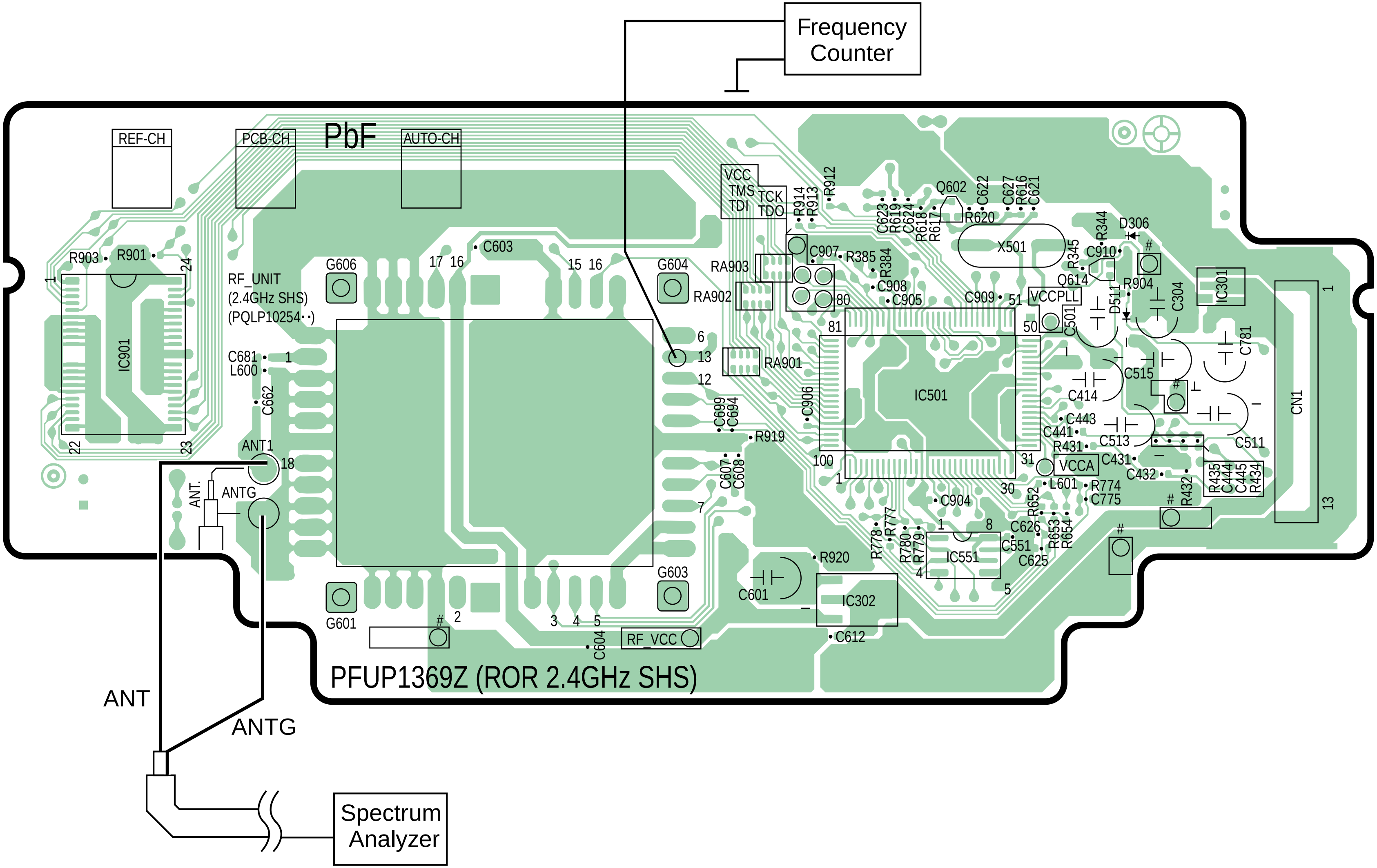
- **When either Vpow or Vpow2 is in use, the other is out of use.**

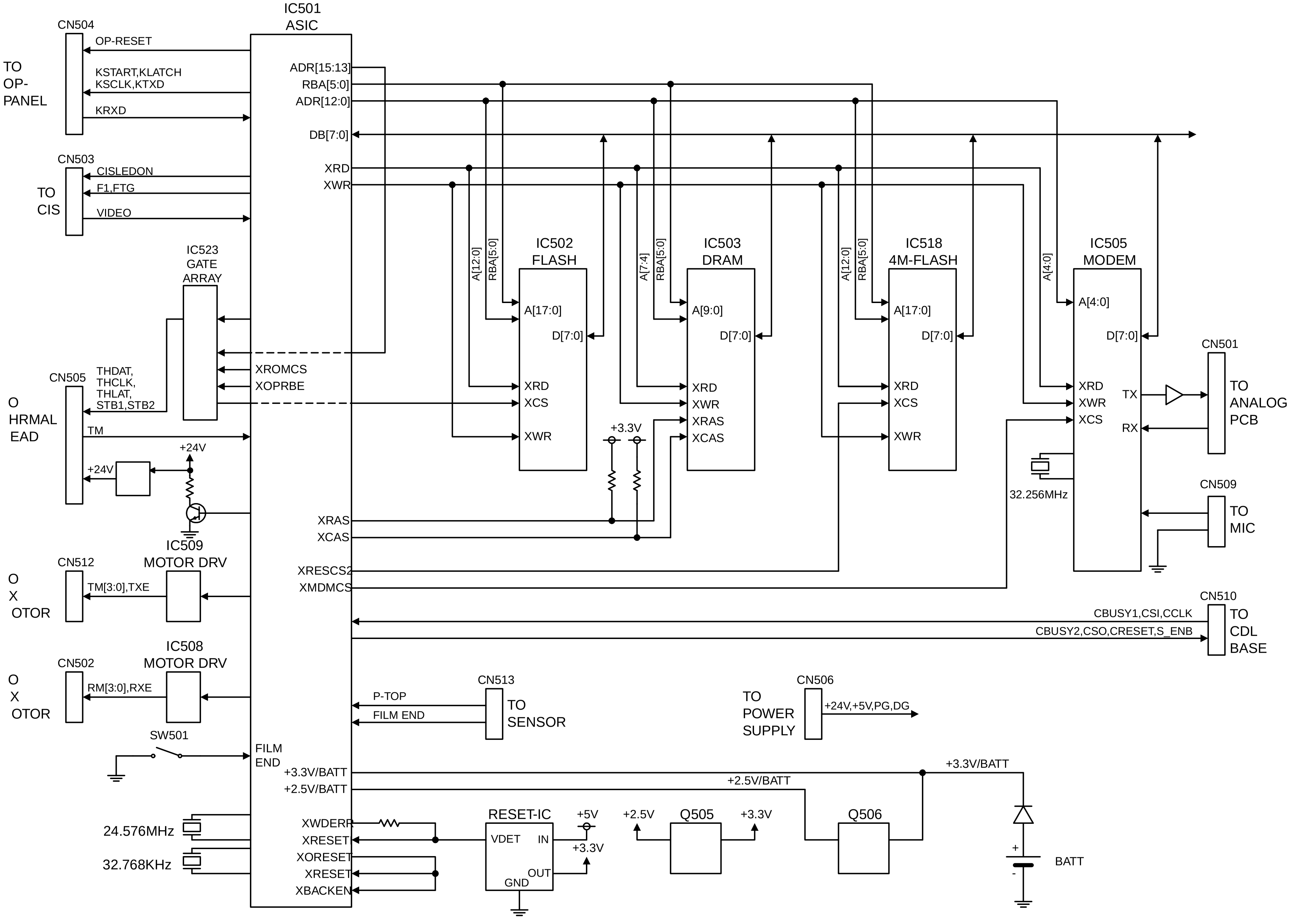


A_1
1
R109
330
C122
7p
L113
10nH
C121
7p
L105
0
L106
10
D104
L107
5.6nH
560
C124
560
C125
C138
7p
L104
1p
L101
10nH
L102
7p
C181
10uF
C182
NC
C183
1000p
C184
1p
R147
0
TP3
BCLK
IC101
32
31
30
29
28
27
26
25
VCC_PA
VDD_PA
SYN_DATA
SYN_EN
SYN_CLK
TXMOD
BCLK
RXGAIN
1
TX
2
GND_RF
3
RX
4
VCC_RF
5
VCC_BIAS
6
REXT
7
TESTP
8
TESTN
24
VCC_PLL2A
23
VCC_PLL2B
22
RXEN
21
TXEN
20
VCC_PLL1A
19
VCC_PLL1B
18
VCC_DIG
17
SHCNTL
9
VCC_IF
10
XOUT
11
XIN
12
VREG
13
VDD
14
RSSI
15
RSTN
16
RX_DATA
C118
7p
C139
7p
C140
1uF
(1608)
R106
10k(1%)
L112
NC
C120
NC
NC
C117
L111
7p
R101
NC
R102
NC
R104
4.7
C178
1uF
C176
1uF
C177
1000p
C179
1000p
C174
NC
R103
10
R107
10
C180
680p
L108
2.2nH
C110
7p
FL101
1
2
3
4
C111
7p
C103
NC
C102
NC
L103
2.7nH
C115
7p
C114
7p
C112
NC
C113
NC
D103
L110
NC
C116
NC
C126
NC
R119
NC
L109
NC
C119
NC
R110
NC
C141
1uF
C144
1000p
X101
8.192MHz
NC
2
1
NC
R114
C149
NC
C148
NC
C145
0.1uF
C143
1p
C142
10uF
R105
0
C146
1000p
L114
1uH
(1608)
C175
390p
R112
NC
C154
1p
Vpow
C153
1p
Vpow2
C157
1p
SYN_DATA
C158
1p
SYN_EN
C159
1p
SYN_CLK
C160
7p
C156
1p
TXMOD
C161
1p
RXGAIN
C162
7p
RXEN
R130
0
C163
7p
TXEN
C164
NC
SHCTRL
C165
220p
RX_DATA
C166
0.01uF
RSTN
C167
1p
RSSI
C168
NC
OSC
C185
NC
DEMOD

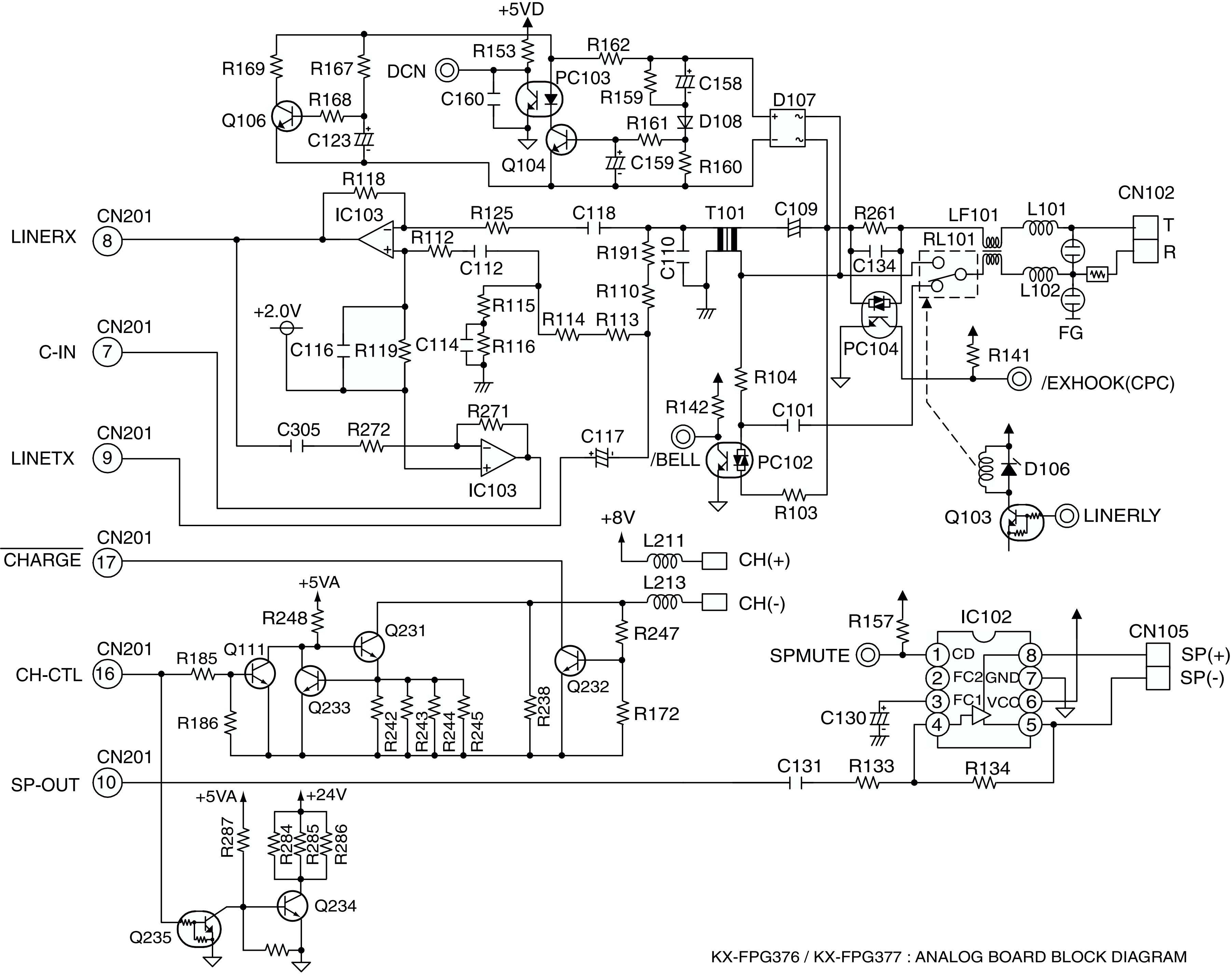
KX-FPG376 / KX-FPG377 :RF UNIT SCHEMATIC DIAGRAM


OSC
1.1kHz
MIC LOAD
10µ
10µ
MIC_H
MIC_P
DC 3.9V
for DC POWER SUPPLY
OSCILLOSCOPE
HANDSET
AC VOLT METER
SPM
SPP
150Ω
Test
OPEN
OSC 1.1kHz
10µ
MIC1
HEADSET
AC VOLT METER
150 Ω
SP1
OSCILLOSCOPE
OSC
FREQUENCY COUNTER (*2)
SPECTRUM ANALYZER
ANT
ANTG
SPM
SPP
8Ω
AC VOLT METER
MONITOR SP
OSCILLOSCOPE
IC201
RF_UNIT
TP VSS
TP VBAT
TP TX
TP RX
TP PM
TP PP
BATT1
BATT2

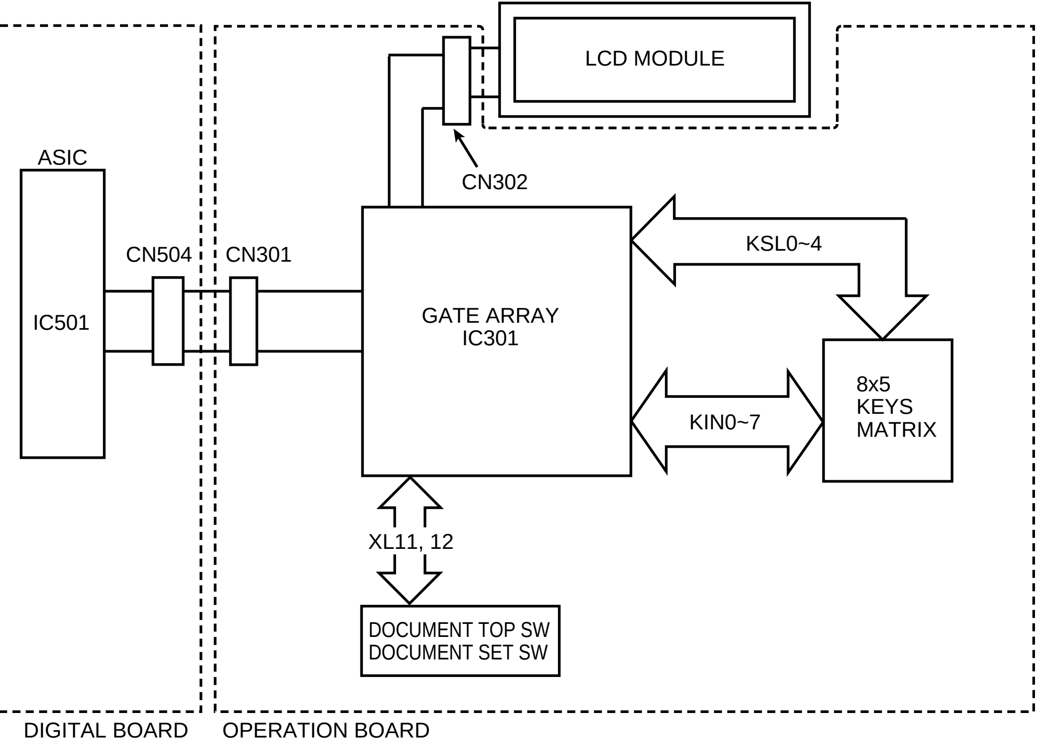

Frequency Counter
Spectrum Analyzer
ANT
ANTG
ANT.
ANT1
PbF
REF-CH
PCB-CH
AUTO-CH
RF_UNIT
(2.4GHz SHS)
(PQLP10254··)
PFUP1369Z (ROR 2.4GHz SHS)
IC901
IC501
IC551
IC302
IC301
CN1
X501
VCC
TMS
TCK
TDI
TDO
VCCPLL
VCCA
RF_VCC
RA901
RA902
RA903
G601
G603
G604
G606
R903
R901
C681
L600
C662
C603
C601
C612
C604
C607
C608
C699
C694
R919
R920
C906
C907
R385
R384
C908
C905
C909
C501
R912
R913
R914
C623
R619
C624
R618
R617
Q602
R620
C622
C627
R616
C621
R344
R345
D306
C910
Q614
R904
D511
C304
C781
C414
C515
C443
C441
R431
C513
C431
C432
C511
R432
R435
C444
C445
R434
L601
R774
C775
C904
R652
C626
C551
R653
R654
C625
R778
R777
R780
R779
1
22
23
24
18
17
16
15
6
13
12
7
2
3
4
5
81
80
51
50
100
31
30
8
#


CN504
TO OP-PANEL
OP-RESET
KSTART,KLATCH
KSCLK,KTXD
KRXD
CN503
TO CIS
CISLEDON
F1,FTG
VIDEO
IC523 GATE ARRAY
CN505
O HRMAL EAD
THDAT,
THCLK,
THLAT,
STB1,STB2
TM
+24V
+24V
IC509 MOTOR DRV
CN512
O X OTOR
TM[3:0],TXE
IC508 MOTOR DRV
CN502
O X OTOR
RM[3:0],RXE
SW501
24.576MHz
32.768KHz
IC501 ASIC
ADR[15:13]
RBA[5:0]
ADR[12:0]
DB[7:0]
XRD
XWR
XROMCS
XOPRBE
XRAS
XCAS
XRESCS2
XMDMCS
FILM END
+3.3V/BATT
+2.5V/BATT
XWDERR
XRESET
XORESET
XRESET
XBACKEN
IC502 FLASH
A[12:0]
RBA[5:0]
A[17:0]
D[7:0]
XRD
XCS
XWR
IC503 DRAM
A[7:4]
RBA[5:0]
A[9:0]
D[7:0]
XRD
XWR
XRAS
XCAS
+3.3V
IC518 4M-FLASH
A[12:0]
RBA[5:0]
A[17:0]
D[7:0]
XRD
XCS
XWR
IC505 MODEM
A[4:0]
A[4:0]
D[7:0]
XRD
XWR
XCS
TX
RX
32.256MHz
CN501
TO ANALOG PCB
CN509
TO MIC
CN510
TO CDL BASE
CBUSY1,CSI,CCLK
CBUSY2,CSO,CRESET,S_ENB
CN513
TO SENSOR
P-TOP
FILM END
CN506
TO POWER SUPPLY
+24V,+5V,PG,DG
+3.3V/BATT
+2.5V/BATT
RESET-IC
VDET
IN
OUT
GND
+5V
+3.3V
+2.5V
Q505
+3.3V
Q506
BATT
+
-

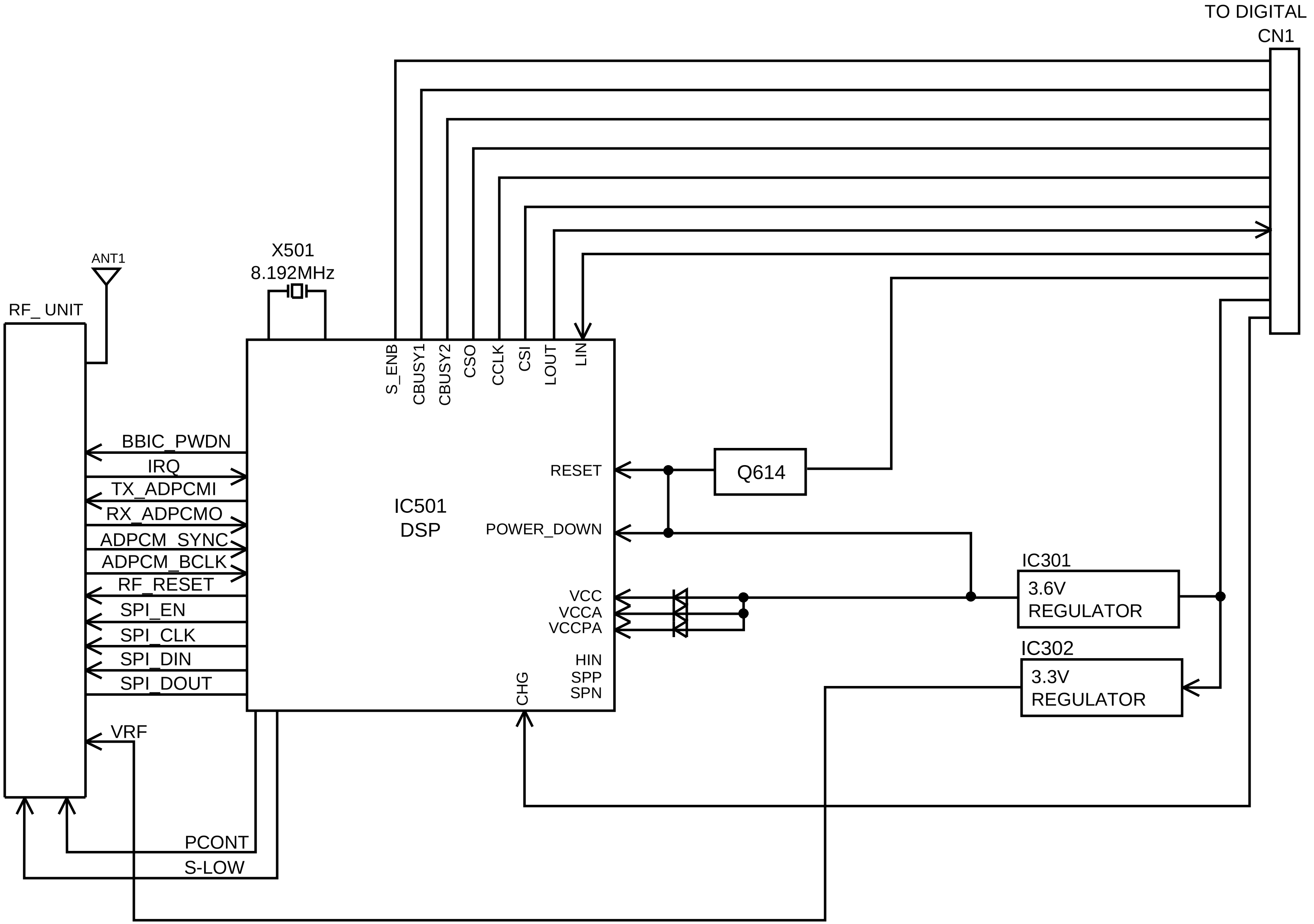
KX-FPG376 / KX-FPG377 : CONTROL SECTION BLOCK DIAGRAM


+5VD
R169
R167
R153
DCN
R162
R159
C158
PC103
C160
Q106
R168
C123
R161
D108
D107
Q104
C159
R160
R118
IC103
R125
C118
T101
C109
R261
LF101
L101
CN102
T
R
LINERX
CN201
8
R112
C112
R191
C110
C134
RL101
L102
+2.0V
R115
R110
FG
C116
R119
C114
R116
R114
R113
PC104
C-IN
CN201
7
R141
R104
/EXHOOK(CPC)
R142
C101
R271
C305
R272
LINETX
CN201
9
C117
/BELL
PC102
D106
IC103
R103
Q103
LINERLY
+8V
L211
CH(+)
CHARGE
CN201
17
L213
CH(-)
+5VA
R248
Q231
R247
R157
IC102
CN105
CH-CTL
CN201
16
R185
Q111
Q232
SPMUTE
1
CD
8
SP(+)
2
FC2
GND
7
SP(-)
Q233
R238
3
FC1
VCC
6
R186
R242
R243
R244
R245
R172
C130
4
5
SP-OUT
CN201
10
C131
R133
R134
+5VA
+24V
R287
R284
R285
R286
Q234
Q235

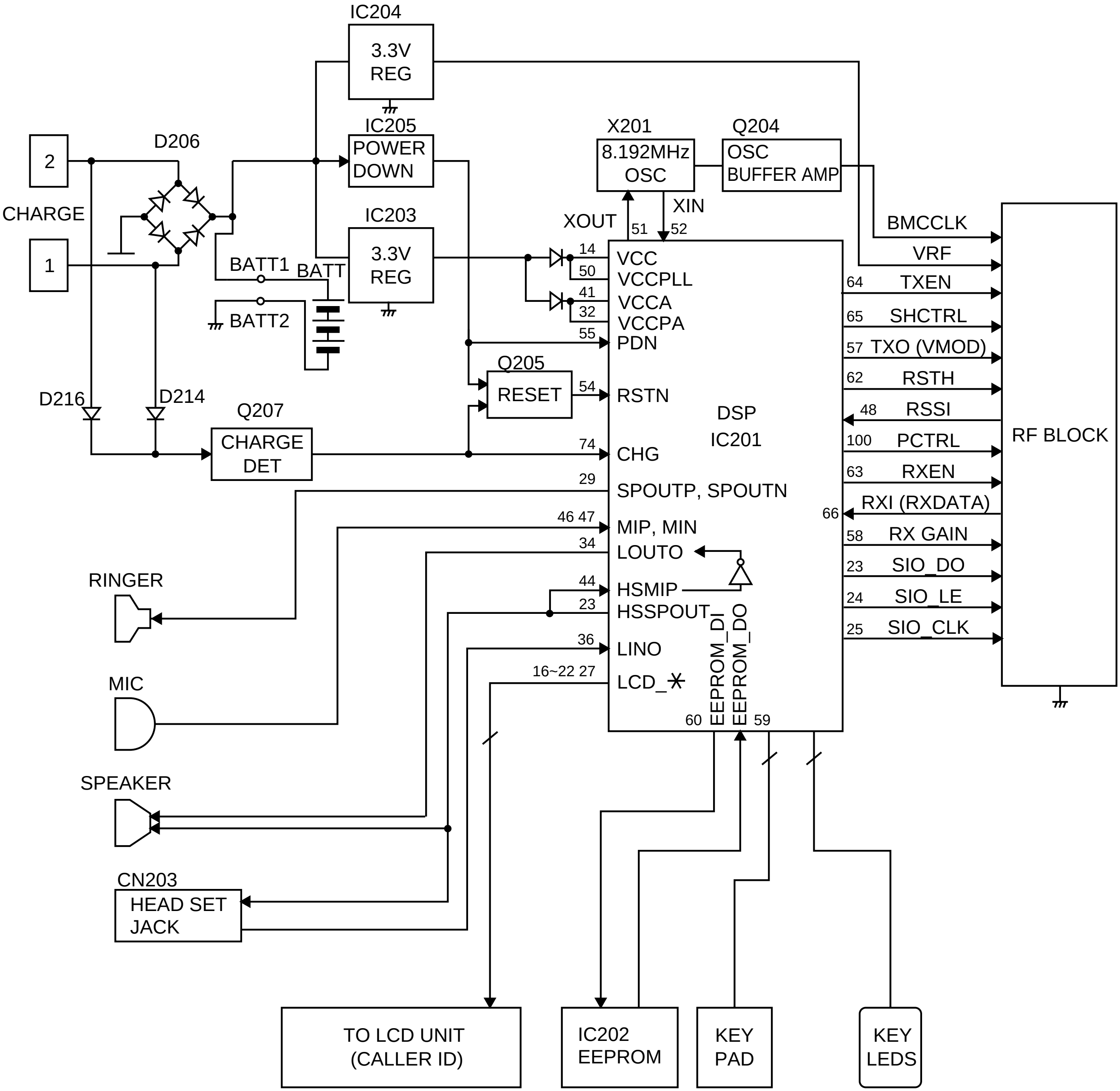
KX-FPG376 / KX-FPG377 : ANALOG BOARD BLOCK DIAGRAM


LCD MODULE
CN302
ASIC
IC501
CN504
CN301
GATE ARRAY
IC301
KSL0~4
KIN0~7
8x5
KEYS
MATRIX
XL11, 12
DOCUMENT TOP SW
DOCUMENT SET SW
DIGITAL BOARD
OPERATION BOARD

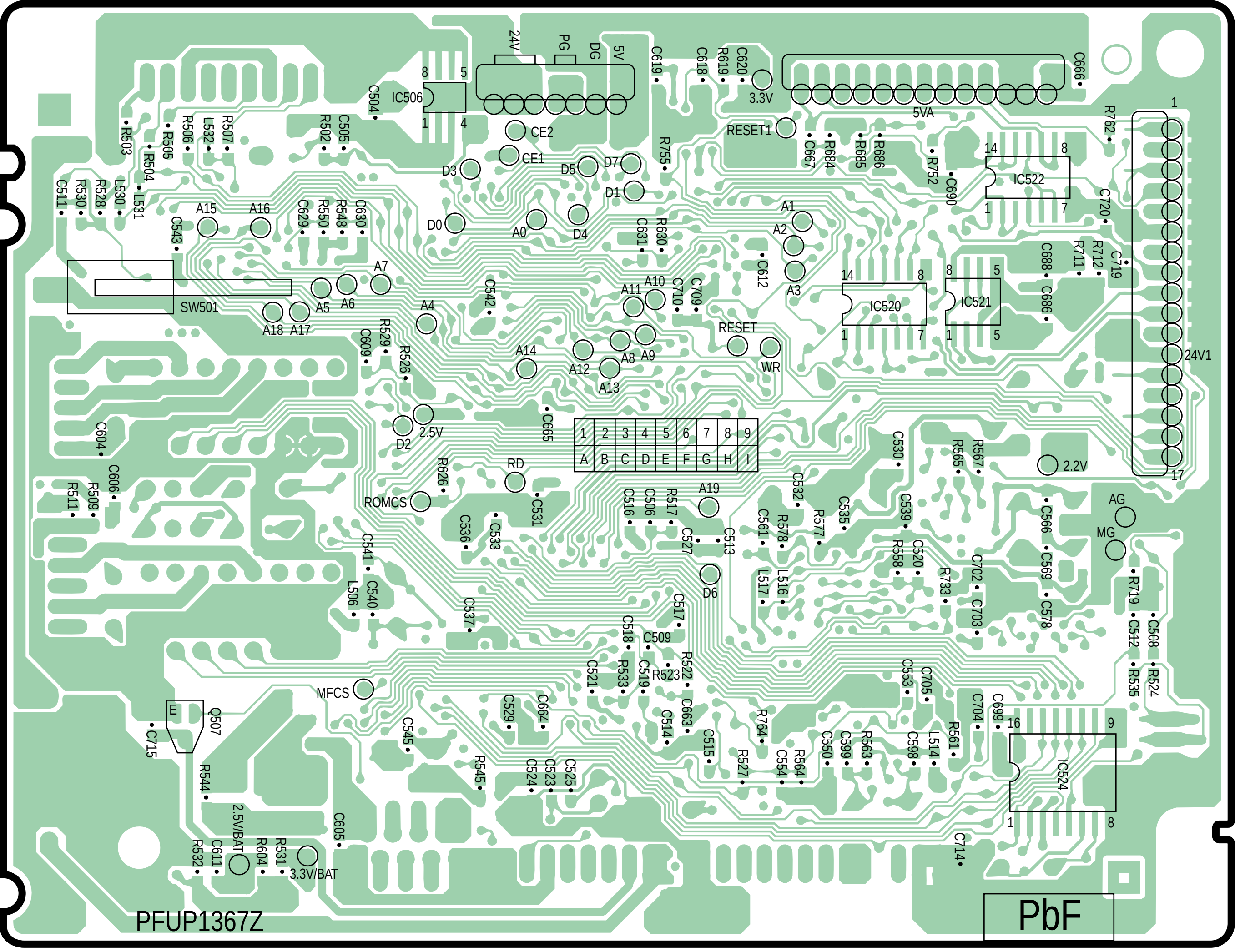
KX-FPG376 / KX-FPG377 : OPERATION BOARD
BLOCK DIAGRAM


TO DIGITAL
CN1
ANT1
RF_ UNIT
X501
8.192MHz
S_ENB
CBUSY1
CBUSY2
CSO
CCLK
CSI
LOUT
LIN
BBIC_PWDN
IRQ
TX_ADPCMI
RX_ADPCMO
ADPCM_SYNC
ADPCM_BCLK
RF_RESET
SPI_EN
SPI_CLK
SPI_DIN
SPI_DOUT
VRF
IC501
DSP
RESET
POWER_DOWN
VCC
VCCA
VCCPA
HIN
SPP
SPN
CHG
Q614
IC301
3.6V
REGULATOR
IC302
3.3V
REGULATOR
PCONT
S-LOW

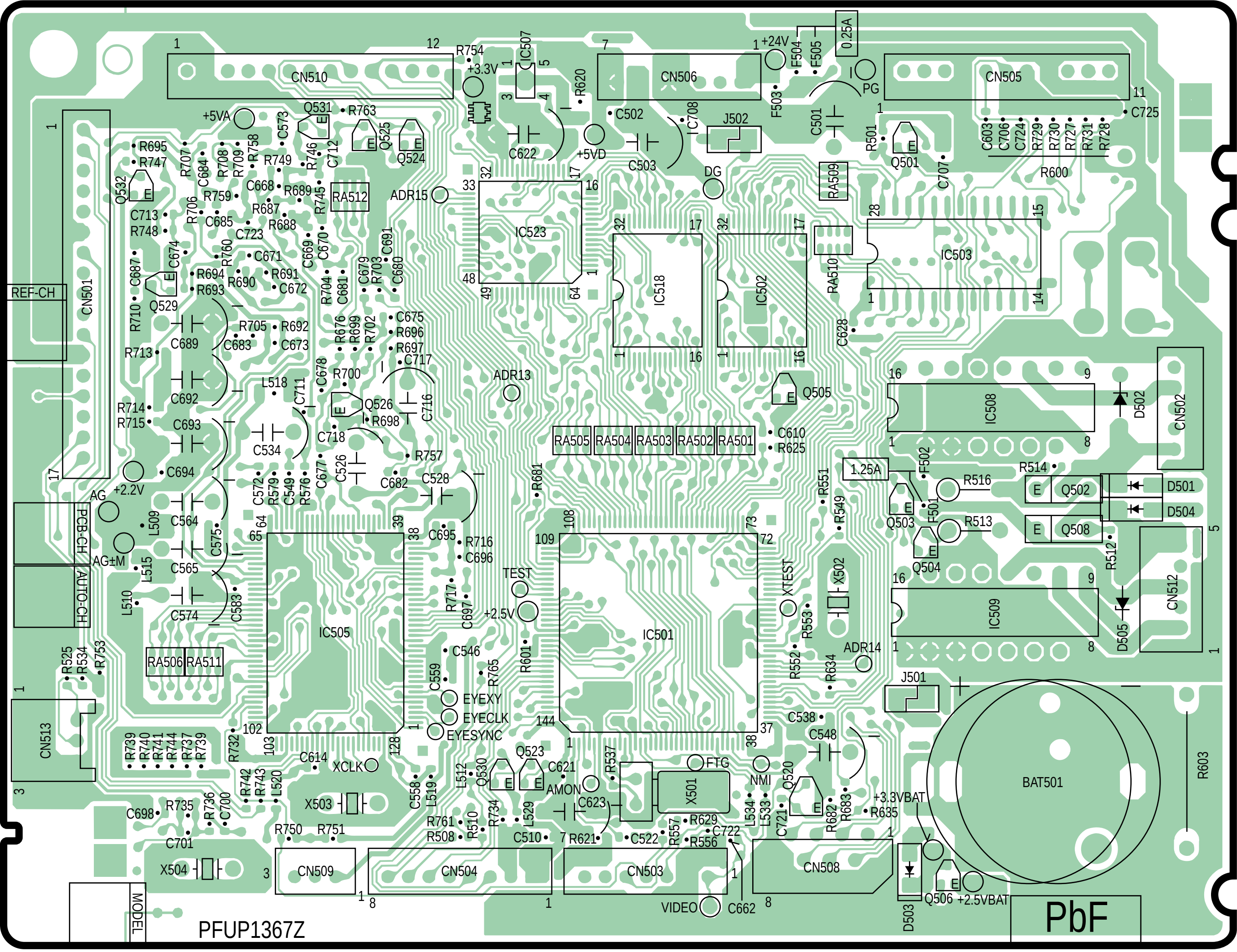
KX-FPG376 / KX-FPG377 : CORDLESS BASE BOARD BLOCK DIAGRAM


IC204
3.3V
REG
IC205
POWER
DOWN
X201
8.192MHz
OSC
Q204
OSC
BUFFER AMP
2
D206
CHARGE
1
BATT1
BATT
BATT2
IC203
3.3V
REG
XOUT
51
XIN
52
14
VCC
50
VCCPLL
41
VCCA
32
VCCPA
55
PDN
Q205
RESET
54
RSTN
DSP
IC201
D216
D214
Q207
CHARGE
DET
74
CHG
29
SPOUTP, SPOUTN
46 47
MIP, MIN
34
LOUTO
44
HSMIP
23
HSSPOUT
36
LINO
16~22 27
LCD_*
60
EEPROM_DI
EEPROM_DO
59
BMCCLK
VRF
64
TXEN
65
SHCTRL
57
TXO (VMOD)
62
RSTH
48
RSSI
100
PCTRL
63
RXEN
66
RXI (RXDATA)
58
RX GAIN
23
SIO_DO
24
SIO_LE
25
SIO_CLK
RF BLOCK
RINGER
MIC
SPEAKER
CN203
HEAD SET
JACK
TO LCD UNIT
(CALLER ID)
IC202
EEPROM
KEY
PAD
KEY
LEDS

KX-FPG376 / KX-FPG377 : HANDSET BLOCK DIAGRAM


24V
PG
DG
5V
C619
C618
R619
C620
3.3V
C666
5VA
8
5
IC506
1
4
C504
CE2
CE1
R503
R505
R506
L532
R507
R502
C505
R504
D3
D5
D7
D1
R755
RESET1
C667
R684
R685
R686
R752
C690
R762
1
14
8
IC522
1
7
C720
C511
R530
R528
L530
L531
A15
A16
C629
R550
R548
C630
C543
D0
A0
D4
C631
R630
A1
A2
A3
C612
R711
R712
C719
C688
C686
A7
A5
A6
A18
A17
SW501
A4
C542
A11
A10
C710
C709
14
8
IC520
1
7
8
5
IC521
1
5
C609
R529
R526
A14
A12
A13
A8
A9
RESET
WR
24V1
2.5V
D2
C665
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
G
H
I
C604
C606
R509
R511
R626
RD
ROMCS
C531
C536
C533
C516
C506
R517
A19
C527
C513
C561
R578
R577
C532
C535
C530
R565
R567
2.2V
17
C539
C566
AG
MG
C541
L506
C540
C537
D6
L517
L516
R558
C520
R733
C702
C703
C569
C578
R719
C512
C508
C517
C518
C509
R522
R523
C521
R533
C519
R535
R524
MFCS
C553
C705
C704
C699
16
9
E
Q507
C715
C529
C664
C545
C514
C663
R764
C515
C550
C599
R563
C598
L514
R561
IC524
R544
R545
C524
C523
C525
R527
C554
R564
1
8
2.5V/BAT
C605
R532
C611
R604
R531
3.3V/BAT
C714
PFUP1367Z
PbF

KX-FPG376/KX-FPG377 : DIGITAL BOARD : BOTTOM VIEW


CN510
1
12
R754
+3.3V
IC507
1
5
3
4
R620
7
CN506
1
+24V
F504
F505
0.25A
F503
PG
CN505
11
C725
C502
C708
J502
C501
1
R501
Q501
C707
C603
C706
C724
R729
R730
R727
R731
R728
R600
+5VA
Q531
R763
C573
Q525
Q524
E
R695
R747
R707
C684
R708
R709
R758
R749
R746
C712
Q532
R759
C668
R689
R745
RA512
ADR15
33
32
17
16
C622
+5VD
C503
DG
RA509
28
15
IC503
1
14
RA510
R706
C713
R748
C685
R687
R688
C723
C669
C670
C691
IC523
48
49
64
1
32
17
32
17
IC518
IC502
1
16
1
16
C674
R760
C671
C687
R694
R693
R690
R691
C672
R704
C681
C679
R703
C680
Q529
R710
CN501
REF-CH
1
17
C689
C683
R705
R692
C673
R676
R699
R702
C675
R696
R697
C717
R713
C692
L518
C711
C678
R700
Q526
R698
C716
ADR13
C628
16
9
IC508
1
8
D502
CN502
Q505
R714
R715
C693
C534
C718
R757
RA505
RA504
RA503
RA502
RA501
C610
R625
+2.2V
C694
C572
R579
C549
R576
C677
C526
C682
C528
R681
R551
1.25A
F502
R514
R516
Q502
D501
D504
AG
PCB-CH
AUTO-CH
AG±M
L509
C564
C575
64
65
39
38
C695
R716
C696
108
109
73
72
R549
Q503
F501
R513
Q504
Q508
R512
5
L515
C565
L510
C574
C583
IC505
R717
C697
TEST
+2.5V
XTEST
X502
R553
IC501
16
9
IC509
1
8
D505
CN512
1
R525
R534
R753
RA506
RA511
C546
R765
R601
C559
ADR14
R552
R634
J501
EYEXY
EYECLK
EYESYNC
144
37
C538
C548
1
CN513
3
R739
R740
R741
R744
R737
R739
R732
102
103
128
1
C614
XCLK
1
Q523
C621
R537
FTG
NMI
Q520
38
BAT501
R603
R742
R743
L520
X503
C558
L519
L512
Q530
AMON
C623
X501
L534
L533
C721
R682
R683
+3.3VBAT
R635
C698
R735
R736
C700
C701
R750
R751
R761
R508
R510
R734
L529
C510
7
R621
C522
R557
R629
C722
R556
X504
3
CN509
1
8
CN504
1
CN503
1
CN508
8
VIDEO
C662
D503
Q506
+2.5VBAT
PbF
MODEL
PFUP1367Z

KX-FPG376/KX-FPG377 : DIGITAL BOARD : COMPONENT VIEW